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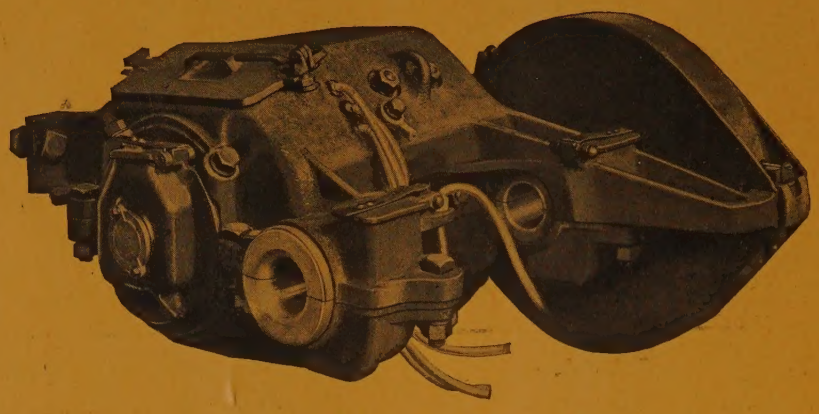

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Electric Railway Journal

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A NOVELTY IN TURBO-GENERATOR DESIGN

The new turbines for the Interborough Rapid Transit Company, of which a preliminary account is given elsewhere in this issue, are distinctive not only on account of the capacity of each set, which is composed of two 15,000-kw units, but also because these machines apply the principles of the exhaust-steam turbine to completely new apparatus. The 30,000-kw set is, in fact, nothing more than a high-pressure reaction turbine exhausting into an entirely separate standard double-flow turbine operating at a lower speed. The advantages of such an arrangement, as applied to units of very large capacity, are obvious. Perhaps the most important is the fact that there is nothing untried about any of the apparatus unless it is that a high-pressure turbine of such a large capacity as 15,000 kw should be considered in the light of an experiment. The use of double units operating at different speeds is, of course, not new. In fact, in one of the present Interborough power stations, the original reciprocating engines coupled to slow-speed alternators are operated in parallel with more modern turbo-generators run by exhaust steam from the engines. This is, indeed, such a satisfactory arrangement from a thermodynamic standpoint that it would be interesting to know just what the results would be in case all of the apparatus was specially designed for the work. For high-pressure steam the engine is generally conceded to be more efficient than the turbine, the latter attaining its best results with vapor of lower density and without the tendency toward leakage between stages. On the other hand, it is quite possible that a 15,000-kw high-pressure unit may be made to eliminate many of the losses which have made the smaller high-pressure turbines less efficient than the rival prime mover. In addition, the experience of the past ten years has shown that the low maintenance charges of the turbine will go far to offset even a considerable loss in efficiency.

A QUESTION OF NOMENCLATURE

The prominence which has suddenly been assumed by the system of railway traction in which locomotives equipped with polyphase motors are operated by single-phase current has raised the interesting question whether such a system can properly be called a single-phase system. The question, of course, is one of nomenclature only, but it is discussed by correspondents in our issues of this week and last week, and it ought to be settled promptly because of the manifest desirability of having recognized standards in all matters of this kind. Otherwise there is great possibility of misunderstanding as to the meaning of certain terms. It seems to us that the kind of power used on the trolley wire, or working conductor, is the critical matter to be considered in this connection, and that this is the plan which has heretofore been generally followed in referring to electric railway systems. Thus in the past a 1200-volt railway has meant a railway on which 1200 volts were used on the working conductor, irrespective of whether the motors were wound for that potential or if two 600-volt motors were used in series. Again, as Mr. Murray says in a letter in our correspondence department this week, it is easy to conceive of three or four electric locomotives running side by side upon a railway equipped with single-phase overhead system and each locomotive having a different type of motor. But if Mr. de Muralt's theory was correct and each system took its name from the type of motor used on the locomotive, one set of electrical engineers might assert that the present New Haven road was a direct-current line because it uses direct-current motors, whereas another would probably insist that the New York Central road from Woodlawn to the Grand Central Station should be classified with the single-phase lines because it is traversed by the New Haven single-phase locomotives. If we are to use only a single term to describe a railway with single-phase current on the overhead wire and polyphase motors on the locomotives, let us choose our term from the most visibly conspicuous part of the equipment, the overhead system, and by all means say that the road is a "single-phase" line.

EXPERIENCED EMPLOYEES PREFERRED

Among the rumors circulated by alleged friends of labor during the late car strike at Buffalo was the statement that the International Railway Company had taken advantage of the sliding-scale system to discharge men who were receiving the maximum wage in order to replace them with new men at the minimum wage. This charge was utterly disproved during the inquiry into the strike causes made by the Buffalo Employers' Association. Testimony by the men themselves disclosed the fact that the company was so desirous of retaining its experienced men that more than 20 per cent of the present platform men were drawing the maximum wage. This is a good record.

but the evident desire of the company to keep experienced men in its service is one which is shared by practically all electric railway companies. The charge that with a sliding scale companies will discharge the experienced men at the higher wage in order to employ inexperienced men at lower wages is ridiculous, but its innate absurdity does not prevent it from often deceiving, for a time at least, the unsophisticated layman. Few interests outside of electric railway management know that the most pressing problem of their claim and transportation departments, as publicly declared at convention after convention, is how to hold the men whose experience insures reasonable freedom from accidents and mistreatment of apparatus. A senior motorman who works, say, 3500 hours a year at 4 cents above the lowest rate receives an additional annual wage of but $140. If he is discharged, the company must spend $50 to $100 merely to school a man in the routine of platform operation, but his education is rarely completed until he has burned out a few armatures, bumped his car into a truck, thrown some passengers by a jerky start, or has even caused serious injury. In truth, no other occupation puts such a premium upon experience as does railway work, because the coolness of the veteran is the best insurance for the life and property which are placed in his care.

CARRYING INSURANCE FOR THE MEN

The employees' insurance plan of the Third Avenue Railway, New York, as disclosed elsewhere in this issue, is a noteworthy advance in welfare work along more practical lines than those afforded by a benefit association alone. Briefly, the railway offers to insure all of its men at the annual rate of $4 per $1,000, adding thereto a gift of $7 for every $4 paid in by its employees. This offer is the result of negotiations with a large insurance company which has agreed to accept, without examination by its own physicians, all of the men of any age whatsoever at the annual rate of $11 per $1,000 insurance. This low figure is made possible, of course, on account of the high average physical condition of the employees as a body, since the greater number are platform men who have already passed the tests of the railway company. It is evident that this insurance plan will be especially welcome to family men, as the lowest death payment is four times that of the employees' benefit association. Besides contributing such a substantial portion of the premium, the railway will arrange to collect the employees' share by withholding 15 cents a week from each policyholder's wages for every $1,000 insurance. In this way the men will not feel in any appreciable degree or be embarrassed by their contribution to the fund. Aside from the life insurance plan, the same underwriting company also offers the extremely low terms of 75 cents a year for accident indemnities up to $1,000. In each case the lowest terms are available only to members of the employees' benefit association, but other employees may participate upon paying a slight additional amount. Another liberal feature of the Third Avenue plan is that the policy may be continued by a man after he leaves the railway. In this event, he must pay the underwriters' usual rate for his age. But, on the whole, this method of co-operating with an established insurance company should prove less cumbersome than self-insurance, aside from the fact that violent fluctuations in the number of deaths and accidents are absorbed much more readily by a large fund than by a small one.

A NEW MOTOR FOR SINGLE-PHASE LINES

In this issue of the Electric Railway Journal important information is given regarding the coming electrification of a section of the Norfolk & Western Railway. As announced in our issue of Aug. 2, the single-phase system has been adopted, but the motors will be of the polyphase type. Thus the advantages of the single-phase transmission with one trolley wire carrying high-voltage current are combined with those of the polyphase induction motor, which is well adapted to low-speed, heavy mountain-climbing service. Up to the present time the Great Northern electrification in the Cascade Range has been the only place where polyphase motors are employed for traction purposes in this country. Two trolley wires are used in that case. The new combination is made possible by the use of a phase-splitting device of the rotary induction type. The theory of this method of operation is not new, but the same statement could have been made in regard to the commutator single-phase motor for railway work when it was first put upon the market. It was known at that time that a motor designed for direct-current work would run on an alternating circuit, but the principle had not been applied to commercial service because of supposed inherent difficulties. one of which was destructive sparking at the commutator. The improvements by which the commutator motor was made suitable for single-phase railway service were consequently changes in design rather than the discovery of a new principle.

In the same way it has long been known that by the introduction of inductive apparatus in the circuit of one set of poles in an induction motor it is possible to produce a phase displacement of 180 deg. in that circuit, so that if the poles of different polarity in the motor are grouped in their proper order an induction motor can be made to run on a single-phase line. This displacement of phase can be secured by either rotating or static apparatus, but up to this time the weight and size of equipment required for securing this result seemed to prohibit its practical application. The rotating apparatus is much lighter than the static apparatus required, but even with its use the capacity of the "phase-splitter" would have to be 25 to 30 per cent of that of the motor to which it is applied.

The details of the new apparatus are not yet forthcoming, but evidently a method has been devised by which polyphase apparatus can secure polyphase current from a single-phase line without this impediment in weight and size of the phase-splitting apparatus, or at least to the extent that it is not a serious objection. Finally, the fact that a contract has been closed for a large number of locomotives upon this principle indicates that the consulting engineers and the manufacturers are convinced that they have found the long-elusive solution to this difficult problem. The results will be of far-reaching significance, and the test to be conducted on a sample locomotive next spring will be awaited with interest.

CALCULATION OF PROBABLE PROFITS

The day is past when an electric railway is built simply because some engineer or promoter has made a rapid survey of the ground and believes that it will pay. The bankers and capitalists who have to provide the funds for the enterprise must have a more definite knowledge of the probable results. It may seem difficult to the layman for anyone to determine in advance the traffic which a projected transportation enterprise will secure and its probable gross income and operating expenses. But if all the conditions are carefully considered in advance and the deductions derived from similar enterprises under similar conditions elsewhere in the country are applied, the problem is not so difficult.

We believe that a series of articles on the earning power of street railways in cities of various populations in this country, published in the STREET RAILWAY JOURNAL during the early nineties, was the first attempt toward an analytical consideration of the probable gross and net receipts of new local transportation enterprises of different sizes. In those articles the principle was developed that while local conditions, especially the topography and configuration of the city, exercise considerable influence upon the earnings of the different properties, yet allowances can be made for these variations, and there still exists a very close relation between the earnings of a property and the population of the city in which it operates. The fact was also developed, for the first time, we believe, in these articles that, considered broadly, the traffic on such transportation systems varies, on the average, approximately, according to the square of the population of the city. These principles have been elaborated and developed since that time, but the fundamental rules there laid down have not been disturbed.

The interurban electric railway, however, presents an entirely different aspect, and the problem of calculating the probable riding upon such a road is much more complicated. Here there is not only the population of the main terminal to be considered but the population of the secondary terminal or terminals, if any, as well as the intervening population. The traffic also naturally may be divided into "through" and "local" travel. At first, investigators were puzzled as to the allowance which should be made for the population of the main terminal, but the general practice now, as described in the article by Mr. Fischer elsewhere in this issue, is to omit it altogether in making the estimates.

This may seem illogical, but the somewhat curious fact was discovered early in the history of this class of investigation, from a comparison of the earnings of a large number of interurban roads entering cities of varying size, that after the terminal city had reached a certain population its size had no appreciable effect on the earnings of the interurban railway property. Then attempts were made to utilize in the statistics some proportion of the population of the main terminal city, the proportion depending upon the size of the city, but the conclusion was finally reached, and is corroborated by Mr. Fischer's analysis, that closer results can be obtained if this population is neglected absolutely. The reason, of course, is that while the main terminal city is a factor and a most important factor in the travel on the railway, every interurban railway may be assumed to have a large city as one terminal. Hence the omission of its population in all cases will not affect the ratio between the lines considered in the comparison.

In a similar way various plans have been proposed to calculate the intervening population on the line not contained in incorporated cities, towns or villages. In the attempt to do this many methods were proposed and employed. One was to obtain from the census reports the average population in the township not included in the incorporated cities, towns and villages in the township and to prorate this population according to the ratio which the total area of the township bore to the area of a strip 2 miles wide extending along the route of the railway and lying within. The theory of this method was that the patronage for the railway would be derived largely from such a strip extending back about 1 mile on each side of the track. Other investigators believed that the strip should be wider or narrower than 1 mile, while still others claimed that no calculation was reliable without a house-to-house count. Mr. Fischer solves this problem in the same way as that which involved the large terminal city. In other words, he believes that the population of the incorporated towns and villages may be considered as an index of the population outside of their limits and hence, in any comparative study, may be omitted because the denominators in all cases will be reduced in approximately the same ratio and thus the varying factor will be canceled.

The points mentioned and the method by which they have been solved are two questions only in the study of this important subject. Other vital matters are: the extent of riding which may be expected between two secondary terminals; the travel to be expected from the intervening population to and from the primary or secondary terminal; the practical limits in distance under present traffic conditions between secondary terminals and the main terminals; the effect of the character of the terminals themselves, that is, whether both are county seats or whether one is a county seat and the other a commercial or manufacturing town; the effect of different schedules or headways upon the probable traffic; the extent to which a freight, package or express service can be developed, etc.

As might be expected, the study of interurban electric railway properties in these respects shows that there is not any hard and fast law, but it also shows that most of the cases fall within such fairly definite limits, when a normal road is considered, that the results can be predicted by certain rules with a fair degree of accuracy. Beyond these bounds and for the abnormal roads a special study of the territory and of the riding habits of the population must be made. This is the province of the expert. As an effort to deduce the general principles of the problem as a guide, both to operating companies and those interested in new projects, Mr. Fischer's contribution is a noteworthy one. It is based not only on theoretical grounds, but upon an extended practical consideration of the subject, and as a pioneer in an extremely complicated but important field of research he is to be congratulated upon his excellent work.

New Headquarters Carhouse of the Union Street Railway

Features of a Recently Completed Installation with Attractive Administrative Offices, Liberal Provision for Employees' Comfort, Noteworthy Instruction Room Facilities and Model Stores Department

One of the latest and most complete carhouses in New England has been placed in service recently by the Union Street Railway Company, of New Bedford, Mass., to accommodate the demands of a rapidly increasing traffic. The new installation is a fireproof structure equipped throughout with automatic sprinklers and adjoins the repair shops of the company at the intersection of Weld and Purchase Streets, approximately one-half mile from the business center of the city. In its provisions for the comfort of employees, equipment for the instruction of trainmen and stores facilities it compares favorably with any plant of the kind now in service in the country. The building has a capacity of 100 standard 40-ft. cars and cost about $150,000 or $1,500 per car, complete. The architectural work was handled by Louis Destremps, New Bedford, Mass., the general design and construction being completed under the direction of Elton S. Wilde, vice-president and general superintendent of the railway company.

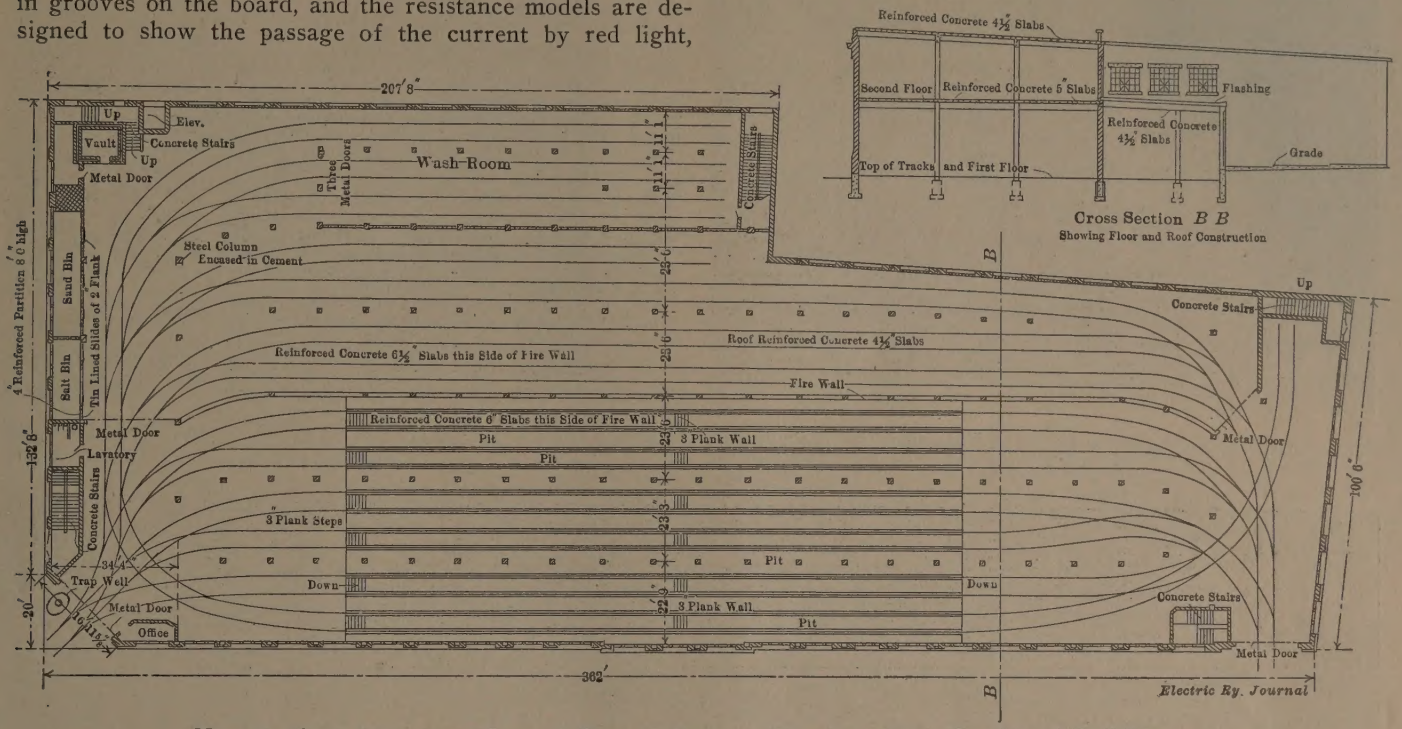
New Bedford Carhouse—Exterior View, Showing Main Entrance

The building is a reinforced concrete structure two stories in height, with external curtain walls of pressed brick, the windows of the street floor being arched at the top, while those on the second story are rectangular. The trimmings are light granolithic, and the roof is bordered by a neat balustrade which adds much to the appearance of the structure. The building is about 362 ft. x 153 ft. in ground dimensions and is provided with connections at each end leading to the main north and south lines of traffic through the city. It contains two main interior subdivisions and thirteen tracks, six of which are provided with inspection and repair pits about 170 ft. long in each case, the pit tracks being about 11 ft. apart on centers. The main entrance, as shown in the accompanying illustration, extends diagonally across the corner of the building, the various tracks being fanned inside as shown in the interior view. The two interior sections are separated by a 16-in. brick fire wall which is carried as near the front of the building as is possible without interfering with the clearance of passing cars. The entire ground floor is devoted to car service, including sand and salt bins, with steam heating for the former, near the main entrance. On the second floor are the general offices of the transportation department, of the general superintendent, superintendent of transportation and storekeeper, the equipment department, a drafting room, storeroom, reading, locker and billiard rooms, and an auditorium containing a complete installation of car equipment for instruction in electrical and air-brake service. A large reserved area is available at the north end of the second floor for storage and other purposes.

INSTRUCTION FACILITIES

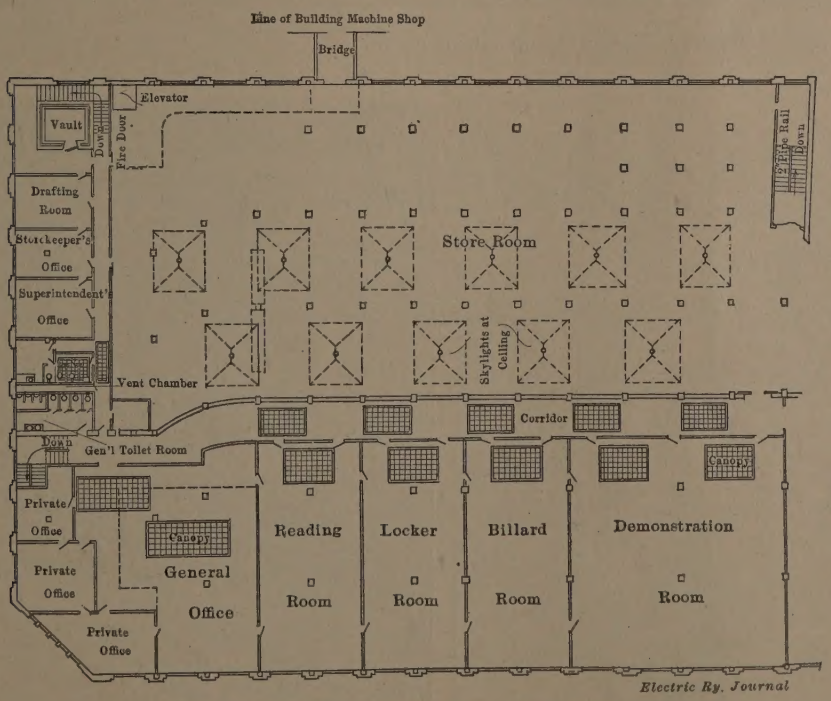
The instruction facilities are located in an assembly room about 55 ft. x 58 ft. in dimensions, and include apparatus for illustrating both the theoretical and practical sides of car operation. As shown by the views on page 295, the equipment is massed at one end of the room upon and at the rear of a broad platform, to facilitate observation of its working from seats in the main body of the auditorium. Practically the entire end of the room is required by the demonstrating equipment and auxiliary apparatus. To illustrate the theory of car operation, the connections of motors, use of resistances and effect of controller handling, a model four-motor circuit with lamps in the field windings and fan motors in the armature positions is shown, the model armatures being made of inverted wash basins attached to the shafts of the driving fan motors and the latter being located at the rear of the demonstration board. The circuits are connected through appropriate resistances to a controller from which all the combinations effected on a full-sized car can be made visually on the board. Each section of resistance is represented by a 115-volt, 16-cp

lamp, and, as in similar apparatus of this character, the arrangement enables the results of poor operation, behavior of motors in case of open circuits, etc., to be studied at length for both two-motor and four-motor equipments. The demonstration circuits are of No. 14 flexible wire carried in grooves on the board, and the resistance models are designed to show the passage of the current by red light, indicating a waste of energy on all but the running points of the controller.



New Bedford Carhouse—General Plan of Ground Floor and Cross-Section of Building

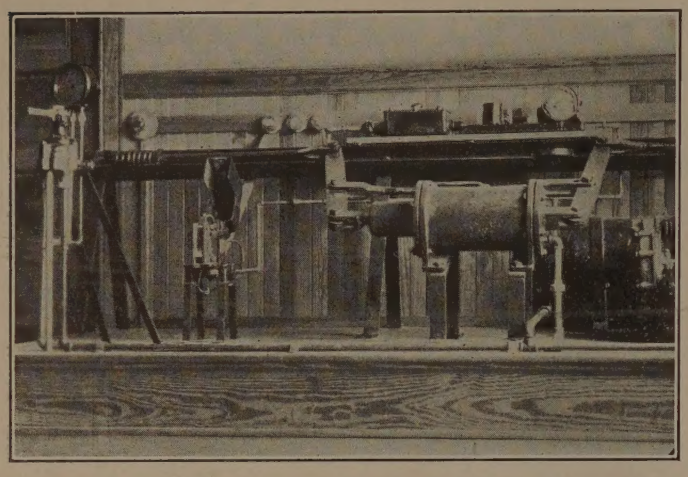
At one side of the board a full-sized truck equipped with two GE-800 motors is mounted, the usual 33-in. wheels being carried on two 6¾-in. x 3-in. idlers in each instance. Behind the truck is a car-control board upon which are mounted all the switches, contactor and resistance equipment required, and this apparatus is labeled as shown in the photograph, with cables run in an open molding along the face of the wall to the motors. A standard car controller wired to the supply circuit of the building enables the motors to be operated at the convenience of the instructor and permits the freest possible use of the equipment by inexperienced men receiving training. The motor leads are lettered as in a standard car-wiring installation. Another interesting feature of the room is a board showing the theory of power supply from the busbar through the feeder switch and overhead system to the car, giving the embryo motorman and conductor a clear idea of the meaning of the electric circuit. To illustrate the phenomena of the magnetic field a piece of an old axle has been wound with wire and connected through a snap switch with the electrical service of the building, and the establishment of lines of force as shown by iron filings, attraction and repulsion and the powerful mechanical pull exercised under proper conditions by a large number of ampere-turns are frequently exhibited. This apparatus is portable, and another portable equipment illustrated in one of the views on the next page shows the use of the magnetic blowout. In this case two arc-lamp carbons are mounted on a horizontal axis close to the tip of a powerful solenoid, the whole being shielded from the observer by a panel of red glass. A snap switch on the outside of the containing box and a flexible connection with the building circuits enable the phenomena of the magnetic blowout to be reproduced to great advantage and have proved of much assistance to the men in teaching them the methods of rupturing circuits carrying current under working conditions. Still a third portable equipment, illustrated herewith, consists of a full-sized car-lighting circuit with wiring carried in a grooved board, vestibule switches and a flexible connection by which the lamps may be illuminated as on a car, the circuit providing for both headlight and interior incandescents.



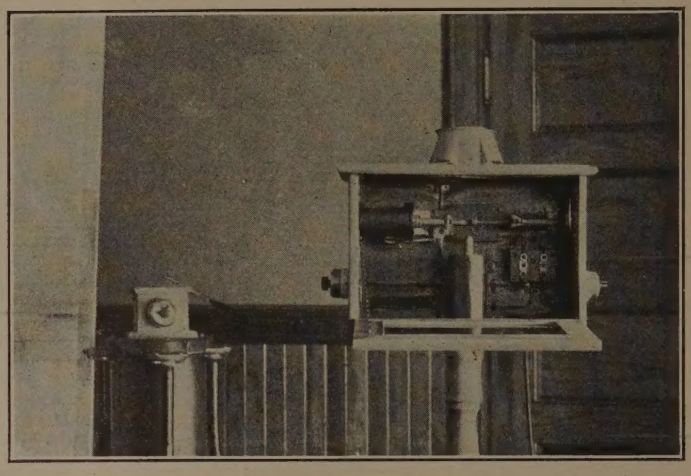
New Bedford Carhouse—Plan of Second Floor

General Electric and National air-brake equipments are exhibited in the auditorium, the apparatus being equipped with colored piping and mounted upon a frame with springs to absorb the power developed in the brake cylinders. There are three styles of brakes shown, all of which work automatically, and the gages, motormen's valves, etc., are piped to motor-driven compressors as in actual service. Another feature of the auditorium is a large bulletin board upon

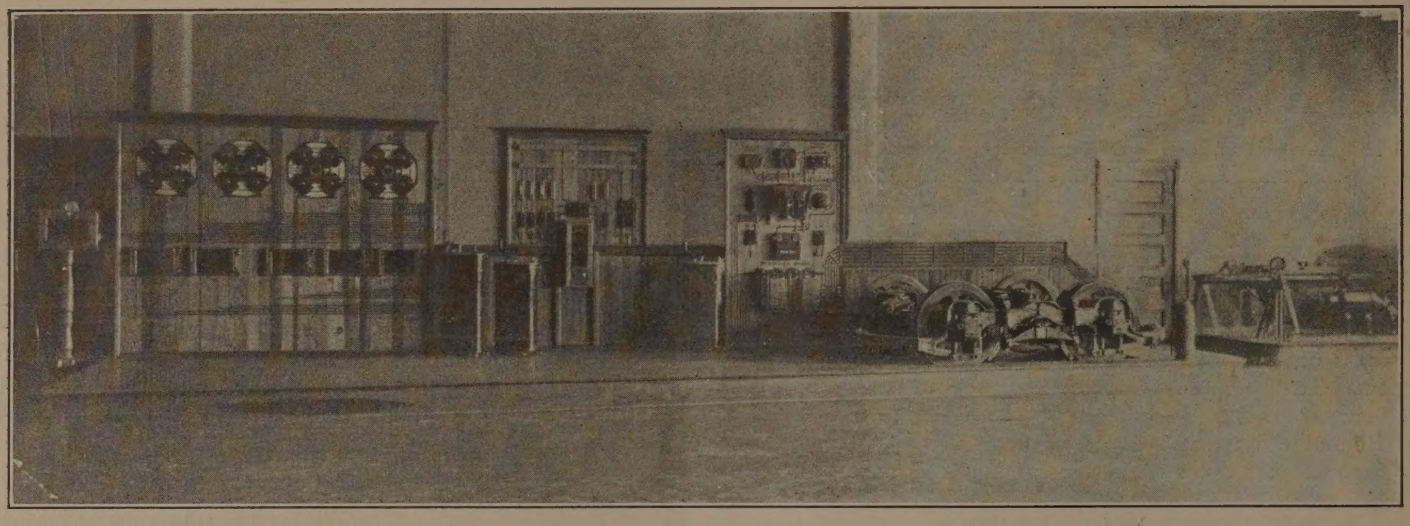
which are daily listed the causes of pull-ins, these being discussed at a weekly meeting of carhouse and other foremen. The room is also provided with a screen for lantern-slide and moving-picture exhibits, and these are used whenever desirable. It is the custom to give a special lecture to the men every fortnight upon some phase of car operation. Classes meet weekly to study the equipment problem. The apparatus in the auditorium also contains several switches by which open circuits can be established in the car wiring at various points so that the men taking the course of study can obtain practice in hunting down troubles. All the apparatus for demonstration was assembled by the em-



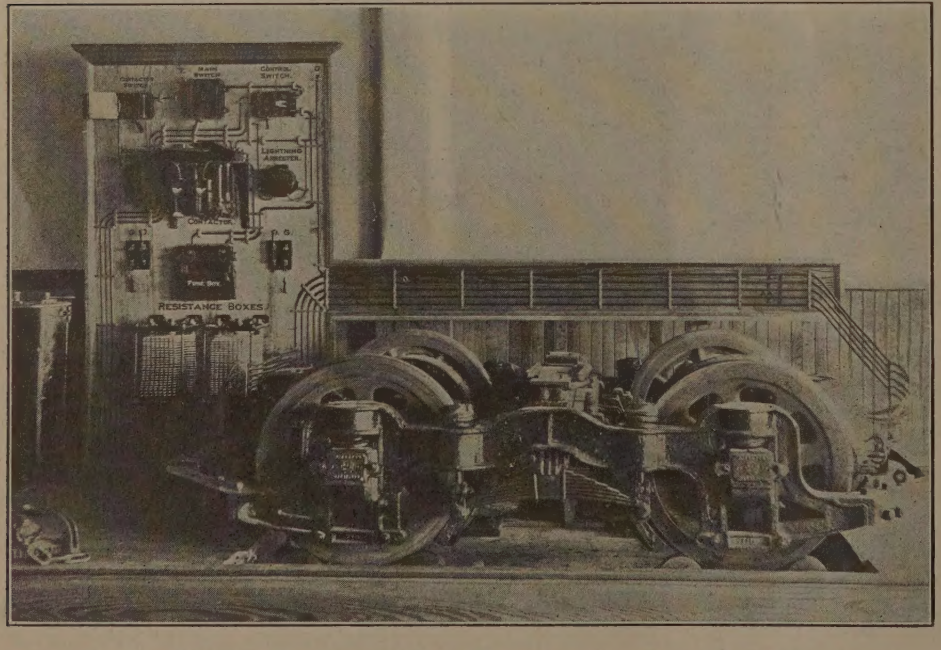
New Bedford Carhouse—Air-Brake Exhibit in Instruction Room



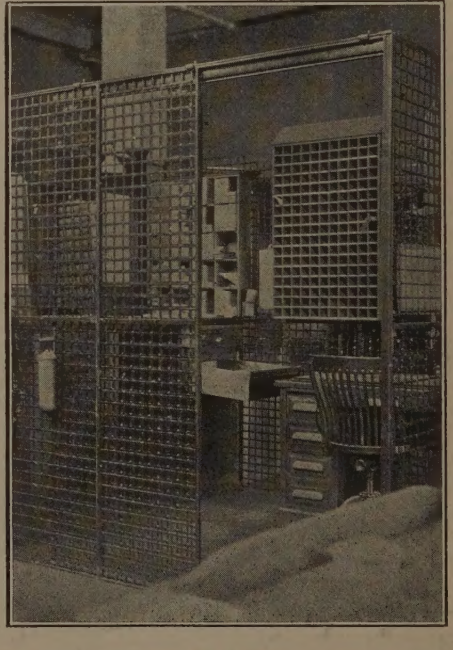
New Bedford Carhouse—Magnet Blowout and Solenoid Apparatus



New Bedford Carhouse—General View of Instruction Room



New Bedford Carhouse—Model Showing Controller Circuits

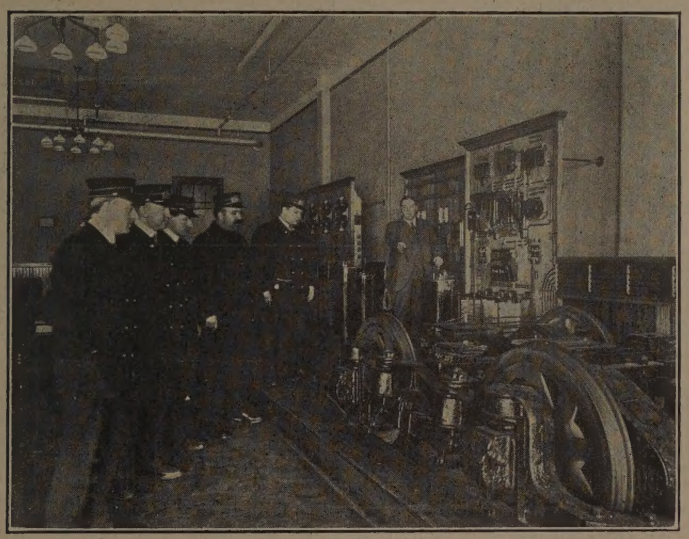


Cashier's Office

ployees of the railway company, many of the features specially mentioned above being original.

STOREROOM

The storeroom is one of the largest of its kind in New England and contains accommodations ample for many a road of much larger size. Only a portion of the space available is as yet occupied, the quarters being 170 ft. long x 80 ft. in width. At present 3241 adjustable steel bins are in service, manufactured by the Lyons Metallic Steel Rack Company, of Aurora, Ill. In a single row of these bins along a part of one wall there are 995 compartments, the bins extending to a maximum length of 126 ft. and to a height of 9 ft. 6 in. In the center of the room the bins are placed back to back, representative rows being 36 in. deep per pair back to back, and from 21 ft. to 31 ft. long. The individual bins vary in size according to local requirements, the maximum range of adjustment being provided by bolts and holes in the steel sheeting, as shown in the accompanying illustrations. The rows are usually 3 ft. deep

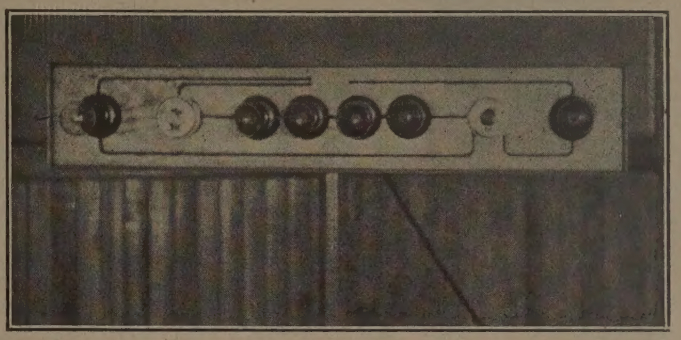


New Bedford Carhouse—Instruction Room

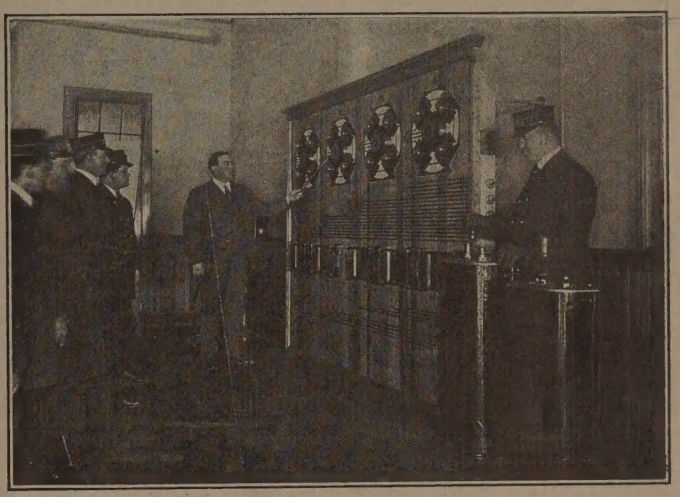
and about 6½ ft. high. Every bin has a number indexed in a card catalog listing all supplies carried in stock, and the largest bin above mentioned is provided with four ladders carried along the front on rollers to facilitate rapid and

New Bedford Carhouse—General Offices

safe work at all heights. A novel feature of the work in this room is the use of roller skates in covering the extended floor area involved, these being worn by stockroom attendants and proving of great value in saving the time required to make trips around the premises. As shown in views on page 298, the use of skates in no way interferes with work on ladders, and in taking inventories of stock these devices have been of great use. The storeroom is



New Bedford Carhouse—Model Car-Lighting Circuit in Instruction Room



New Bedford Carhouse—Instruction Room

open daily from 7 a. m. to 5 p. m., and is connected with the company's repair shops in an adjoining building by a short landing and stairway. An electric elevator is also provided connecting the storeroom with the street surface.

New Bedford Carhouse—General Offices

STOREROOM ACCOUNTS

The system of handling supplies is the result of long experience in the company's shops and merits brief description. Goods are received by a clerk in the stockroom, who

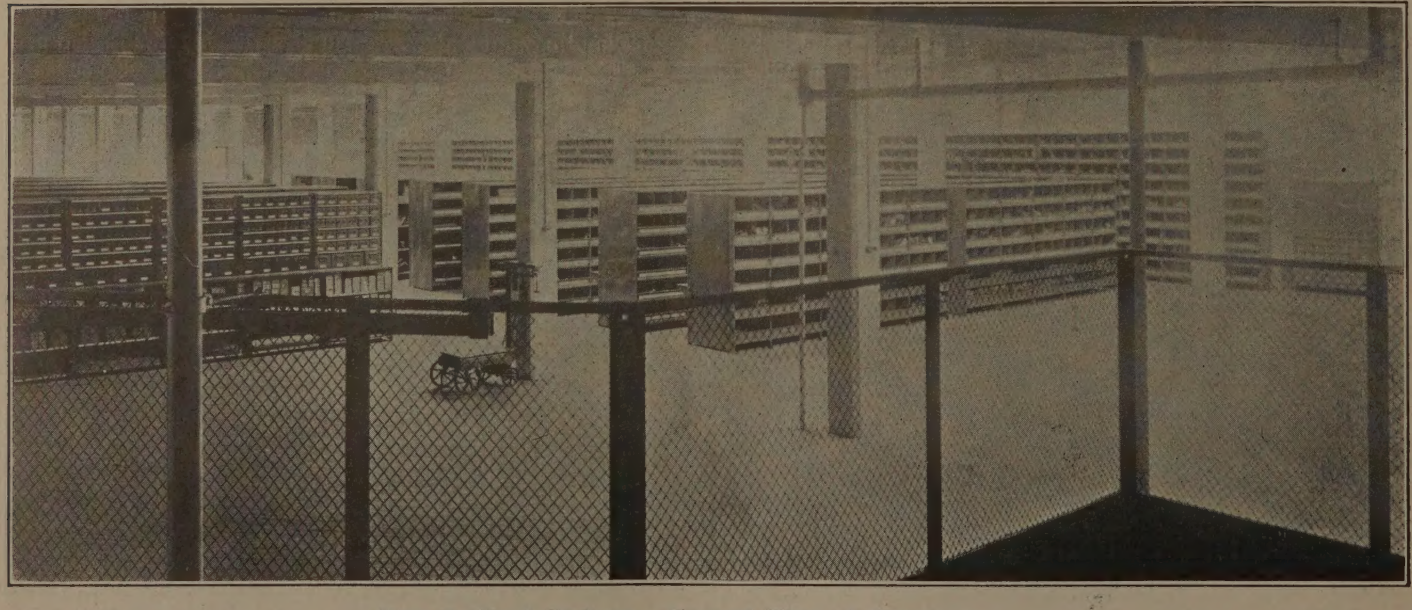
counts them and places them in the proper rack, making a record on the receiving manifest of their receipt. This manifest calls simply for the quantity, article shipped and carrier and states that the goods have been received in good condition. At the same time he enters a memorandum of their receipt upon a bin stock card, which is of the usual

New Bedford Carhouse—Portion of Storeroom

New Bedford Carhouse—Portion of Storeroom

form, with the stockroom section number, bill number and name and catalog number of the article at the top and spaces below where the quantity in and quantity out can be entered. The quantity of material on the bin stock card is a check upon the goods on hand as well as the permanent stock card. At the close of each day the receiving manifests are sent to the general office, where all the bills are checked.

In checking the bills the general office first attaches to the bill an approval slip which has a space for the order number, audit number, check number, distribution and approvals. The bill is then checked with the order book to see if the same quantity and quality of goods as ordered have been billed, and the order entered on the approval slip. The clerk next checks the bill with the receiving manifest and if the goods have been received enters the invoice on the supply journal, whose headings are: audit number date of invoice, consignor, date received, description of goods, amount, total, order number, paid by voucher number. This journal is in duplicate so that the storekeeper can have a copy and enter the goods upon his stock cards, of which he has one for each bin with spaces for recording material in and out and its value. The supply journal is nothing more than a record of goods which the general office has charged the supply account. The duplicate record is retained by the storekeeper for reference, as by referring to the audit number, which is also shown on the stock card, the storekeeper can trace any invoice. No goods are delivered from the storeroom without an order which must be signed by a foreman, which shows the purpose of the requisition. These orders are presented to the stockroom clerk, who delivers the material and charges them out on the bin stock card already described. The orders are classified in accordance with various accounts to be charged, with reference to the stock cards, as the supply of material is drawn upon. At the same time a record is made on a supply sheet which the storekeeper sends once a month to the general office as a record of supplies given out and with which the supply account should be credited.



New Bedford Carhouse—General View of Storeroom

GENERAL OFFICE AND TRAINMEN'S ROOM

The general office, trainmen's lobby and poolroom are illustrated herewith and provide unusually roomy accommo-

dations. The general office is equipped with three cashiers' cages, the usual size being 20 ft. x 9 ft., and contains the company's local private branch telephone exchange, with a board of sixty jacks. A fifteen-station "autocall" is in service, by which signal bells calling officials to the offices

New Bedford Carhouse—Reading Room and Lobby

carhouse. At night this device gives the transportation department a close check upon the behavior of the wind, bringing the indications of the weather vane to the office desk and doing away with the difficulties of trying to read an overhead vane in the dark in the work of anticipating car service to meet possible changes in the weather.

New Bedford Carhouse—Pool Room

are rung in the various departments, through an automatic alarm mechanism at the telephone switchboard. An information bureau and lost article window are also provided in the general office. The floors of these rooms and the offices of the general superintendent, trainmaster, storekeeper, etc., are covered with battleship linoleum ¼ in. thick. The motormen and conductors' lobby or reading room, 23 ft. x 68 ft., contains half a dozen writing tables, two card tables, sofas, settees and bookcase, with magazines and papers, and an adjoining locker room contains 146 metal lockers of the open grill-work type. In the pool room, illustrated herewith, are three tables, with facilities for card and checker games. The pool tables are illuminated in each case by five

The carhouse is equipped with 1251 sprinkler heads of the Grinnell type, installed by the General Fire Extinguisher Company, of Providence, R. I. The lower floor is equipped mainly with the dry pipe system, the wet pipe system being installed on the second story. City water is used in this service, and a 20,000-gal. storage tank installed 36 ft. above the roof provides the necessary storage and pressure regulation. The tank is connected by a 6-in. pipe with the city main, and the distributing system is supplied through a similar pipe. The heads are installed on the average about 10 ft. apart and about 20 ft. above the floor. No aisle sprinklers are used, but the customary automatic alarm service and subdivision of sections through appropriately

New Bedford Carhouse—View of Entrance to Typical Bay; Dry Valves and Sprinkler System

16-cp lamps installed in a 22-in x 36-in. reflector whose bottom is carried 4 ft. above the table. Electric clock service is used throughout the carhouse and shops.

OTHER EQUIPMENT

The minor apparatus in the carhouse includes an electrical wind-direction indicator, connected through suitable resistances and contacts with a weather vane on the roof of the

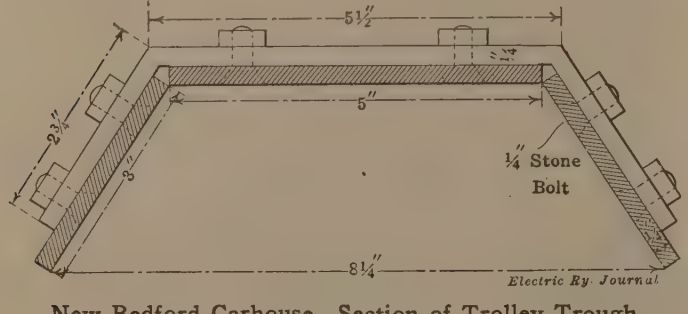
labeled valves is employed. A view is shown of a representative dry valve installation.

All the lighting of the building is supplied from the railway company's circuits, there being 1370 lamps in the carhouse, the greater part being 23-watt tungsten lamps. On the lower floor are installed 765 lamps, including those used in pit lighting. Pit lamps are installed 3 ft. 6 in. above the

floor and 36 in. apart, there being forty lights per pit, or twenty on each side. Single lamps for general interior illumination are spaced about 3 ft. apart and are in general carried 10 ft. from the floor in horizontal runs in the carhouse proper. All the lamps are controlled from a 5-ft. 6-in. x 4-in. panel. This is mounted on a raised platform just inside the main entrance of the carhouse and carries a watt-

New Bedford Carhouse—Use of Roller Skates by Attendants in Storeroom

hour meter totalizing the input for lighting service, switches and fuses for the various circuits. About sixty circuits are run from this board in iron conduits. Inside the carhouse a fabricated iron trolley trough, illustrated in the accompanying drawing, is used above all tracks. This is



New Bedford Carhouse—Section of Trolley Trough

assembled from ¼-in. stock and is fastened together by stove bolts, being 5 in. wide at the top and 8¼ in. wide at the bottom, the suspension being effected by pull-offs and strain insulators, illustrated in the view of the carhouse interior on page 297.

Owing to the extreme drought which has prevailed in most parts of the central districts of the country, a good deal of trouble has been experienced by electric railways in securing water for power plant operations. At Charlestown, Ind., where the Louisville & Northern Railway & Lighting Company has a power station, the spring which supplied the cistern used by the company ran dry, making it necessary to haul water in tank cars to the plant.

SINGLE-PHASE-POLYPHASE MOTORS FOR THE NORFOLK & WESTERN

As announced in the issue of the Electric Railway Journal for Aug. 2, a contract has been closed between the Norfolk & Western Railway and the Westinghouse companies for the equipment of a mountain division for single-phase electrical operation for freight service. The locomotives will be designed to handle freight trains of 3250 tons weight exclusive of the locomotive at a speed of 14 m.p.h. on a 2 per cent grade, and they will be operated at speeds up to 28 m.p.h. on lighter grades. Four locomotives will be used on the heaviest grades, two in front and two at the rear of each train. They are to be arranged for multiple-unit operation in pairs, but no electrical connection will exist between the two ends of the train.

NEW TYPE OF MOTORS

The motors for these locomotives, which are now in process of construction by the Westinghouse Electric & Manufacturing Company, present a novel departure from the existing practice in design for traction purposes. They will be constructed without commutators and will follow the principles of the standard polyphase induction motor, retaining all the advantages in ruggedness and absence of complication which are characteristic of the latter type. As they will, however, receive power which will be originally in single-phase form, as received from the overhead conductors, the current will be passed through a phase-splitting device before reaching the motors so that the equipment as a whole may be properly described as of the single-phase-polyphase type.

In detail, the electrical equipment of each locomotive will comprise four polyphase induction motors of a total continuous rating which will approximate 1300 hp at 14 m.p.h. Each motor will have windings for producing either four or eight poles so that the speed may be changed accordingly and will be equipped with a wound secondary in order to provide for the insertion of resistance and for connection in cascade for producing low speed at starting and for switching service. There will thus be two running speeds, 28 and 14 m.p.h., and a switching speed of 7 m.p.h.

The motors will be geared in pairs through a jack shaft, crank and side rods to the driving wheels, the gear ratio being 18 to 85 and the driving wheels 62 in. in diameter. Each pair of motors will be mounted on a truck with two driving axles and a pony axle, the latter carrying 30-in. wheels. The two trucks are to be coupled together through a Mallet hinge.

As mentioned in previous accounts of the Norfolk & Western installation, the trolley voltage will be 11,000 and the frequency twenty-five cycles per second. Part of the trolley wire will be supplied direct from the 11,000-volt generator in the power house at Bluefield and part through transformers lowering the pressure from 33,000 volts, at which the outlying parts of the line will be supplied. On each locomotive will be a single transformer stepping the voltage down from 11,000 to approximately 750, provision being made for a slight adjustment of the secondary voltage. From this secondary current will pass through a rotating induction apparatus for transforming the phase relation, provision being made for suitable adjustment for keeping the phase voltages balanced. The polyphase current will then pass into the motors. These, as previously stated, will have wound secondaries and slip rings arranged for cascade connection.

SPECIAL ADVANTAGES OF THIS TYPE OF MOTOR

This type of induction motor, while quite unusual in the traction field, has been very successful in different forms in rolling-mill work and the like. It has an advantage in this case for several important reasons. In the first place, the grades to be encountered are unusually heavy and regenerative control will be a considerable advantage. This

is true not so much on account of the saving in power as from the consideration of safety in descending grades. Incidentally there will undoubtedly be quite a saving in wear of brakeshoes and tires. In descending grades the two units comprising the head locomotive will be connected to pump back into the line and they will be loaded to their full capacity. When other trains are to be in the electric division this saving will probably be considerable as it will lighten the load on the station and improve its load-factor. When the descending train is the only one on the line the power will be absorbed in suitable rheostats in the power plant.

MOTOR CONTROL

The control of the motors will be accomplished through rheostats connected in the secondary circuits. For starting and for speeds up to 7 m.p.h. the motors on each truck will be connected in cascade and the two sets of cascades will be connected in parallel. Resistance also will be inserted in the secondaries at starting. In this combination of connections the primaries will be arranged for eight poles. With the combination of connections for the first running speed of 14 m.p.h. all motors will be in parallel, with the primaries connected for eight poles. With the second speed combination of connections the four-pole arrangement will be used, giving a speed of 28 m.p.h., resistance being used on all intermediate steps.

SPACE LIMITATIONS AND COST

The use of the induction motor in place of the commutator motor for this installation involves an important consideration, in addition to those mentioned, namely, that of cost. On account of the space limitations combined with the particular speed specified, the induction motor worked out cheaper than the commutator motor. The space limitations dictated a long motor, small in diameter, and although a commutator motor would have been entirely practicable it would have been more expensive than the induction motor at the low speed required. At a somewhat higher speed the condition might have been reversed. Hence a decision between two types depended not upon the basis of their operating characteristics alone, but upon these combined with cost under space limitations.

The detailed designs for the motor have already been worked out and they are practically ready for the shops. Details of the construction and of the phase-splitting induction apparatus will be given in a later issue of the Electric Railway Journal. In accordance with the custom of the manufacturing of such apparatus the first locomotive will be submitted to the railway company for test and approval before the entire order is completed. The manufacturer expects to complete the first one about Jan. 1, 1914. The carrying out of this contract will give form to one of the most important projects of steam railroad electrification yet undertaken. It calls for the manufacture and delivery of twenty-six 130-ton electric locomotives of the single-phase-polyphase type, together with all required power house generating machinery and transmission apparatus.

TRAFFIC CONDITIONS

The use of the two running speeds of 14 m.p.h. and 28 m.p.h., which will be to a large degree maintained very closely, will under the circumstances existing in this case be peculiarly applicable for the service, as the locomotives are intended for handling only "tonnage trains." These will be loaded with coal originating in the vicinity as the Bluefield-Vivian division serves the celebrated Pocahontas coal region, one of the largest coal fields in the world. The shipments of coal handled amount to 65,000 tons per day, necessitating the trains weighing as much as 3250 tons, and it is to facilitate the handling of this heavy traffic that the electrical operation has been decided upon.

As mentioned before, there are a number of grades on this section, the maximum being 2 per cent, and at the present three Mallet locomotives, the most powerful type of steam locomotive built, are required for each train. One locomotive is used at the head of the train and two for pushing. Only two electric locomotives will be required for this service and the present speed will be doubled. The extent to which this quick train movement will enlarge the capacity of the railroad is quite apparent. In addition one of the present impediments to rapid operation of this section of the road is the existence of a 3100-ft. tunnel which is difficult to ventilate. This tunnel under electric operation will, of course, owing to the absence of smoke and noxious gases offer no impediment to frequent train movement.

In consequence the traffic conditions of this section of the road are especially well adapted to electrical operation. It is in reality a separate engine division at present and can be operated electrically without affecting the cost of engine service on other sections of the line. Conditions that are conducive to high economy in such an electrification are as follows: Traffic requirements permit a minimum electrical equipment to give practically continuous service; fewer engine crews are needed per train; the speed of operation over the division will be nearly doubled; the capacity of the electrified section is increased; the electric locomotives are not limited to such short hours of service, on account of boiler and fire conditions, as in steam locomotives; watering and coaling delays incident to steam operation will be entirely eliminated; the general reliability of locomotive operation will be considerably improved.

Power for the entire electrified section will be generated in a central power house located at Bluestone, W. Va., with an installed capacity of 27,000 kw in turbo-generators, supplied by the Westinghouse company.

The Norfolk & Western development has been worked out by co-operation between the consulting engineers, Gibbs & Hill, on the one side, and the Westinghouse Electric & Manufacturing Company and the Westinghouse Machine Company on the other. The project represents a distinct advance in the development of steam railway electrification, combining, as it does, the advantages of the single-phase transmission with the excellent qualities of the polyphase motor, and the results will be watched with interest by steam and electric traction officials.

WAGE AGREEMENT ON AURORA, ELGIN & CHICAGO

After negotiations extending over practically eight weeks, the Aurora, Elgin & Chicago Railroad has reached a wage agreement with its employees for a period of three years beginning June 1, 1913, as follows:

Third-rail division between Elgin and Chicago: first-year men, 28 cents per hour; second-year men, 31 cents; third year, 34 cents. Additional increases for employees at the close of the second year beginning June 1, 1914, and thereafter: first-year men, 30 cents per hour; second year, 33 cents; third year and over, 36 cents. Switchmen are to have a ten-hour day with the following scale of wages: first year, 30 cents; second year and over, 32⅔ cents, with 10 cents per hour additional for all overtime.

On the Fox River division, Aurora & Elgin trainmen will receive 5 cents per hour extra for overtime when assigned work by the dispatcher after the regular schedule is completed. Delay in completing regular scheduded runs is not figured as overtime. Trainmen on the line between Aurora and Elgin will receive for the first and second year 29 cents per hour; third year and thereafter, 30 cents. On the lines between Aurora and Yorkville and between Elgin and Carpenterville trainmen will receive 28 cents per hour for the first year contract and thereafter. Trainmen on city lines at Aurora and Elgin will receive during first year of contract the following: first-year men, 23 cents per hour; second year, 24 cents; third year, 26 cents. For the second year of contract and thereafter an increase of ½ cent per hour is given to each grade of trainmen.

THE FUNCTIONS OF PUBLIC SERVICE COMMISSIONS

At a meeting this week of the Michigan Section of the National Electric Light Association William J. Norton, secretary of the research committee of that association and formerly first assistant secretary of the Public Service Commission, First District, New York, read a paper entitled "The Two Epochs of Rate Regulation." He took the fact of the appointment of ten new public commissions during 1912-13 as the text for discussing the proper function of such commissions. The vast amount of purely administrative detail which the new commissioners must master upon taking office was sufficient, according to the speaker, even if these new commissioners were well-trained executives, to occupy a year without any other work. But the chances are that they would have important cases thrust upon their dockets, or, in the attempt to create the impression that they are accomplishing something, they will demand of the companies under their jurisdiction enormous quantities of information, including complete summaries of books of account, entire inventories of all property, and a great mass of other information. These demands will involve the companies in great expense, although, as a rule, the commissions will be utterly unable for a long time, if ever, to digest the information thus secured.

In the speaker's opinion, public service regulations should be divided into two separate epochs, namely: (1) the preparatory period of regulation and (2) the final period of regulation. Continuing, he said in part:

"The states for years have had the right to regulate the public service companies. It is only recently, however, that they have seen fit fully to exercise this right and delegate the regulating authority. In the meantime the utilities under the law have established certain methods of doing business.

"Rates were originally on a purely bargain basis, but they have slowly emerged, with the efforts of the companies themselves, to a point where most schedules are published and, with the exception of certain old contracts, are not discriminatory. Many companies have also established proper depreciation or reserve funds, and, while perhaps not always adequate, a good beginning has been made. This also has been without any suggestion or help from the state.

"Few companies have been able to make complete valuations mainly because they have felt that they could not afford out of operating revenues to incur the expense. But uniform accounting methods have been started, and the bookkeeping of the more recent years is correct in that it shows a proper discrimination between capital and operating charges. Here also no assistance, encouragement or advice was received from the state.

EXPECTATIONS OF THE PUBLIC

"The public, on the other hand, believes that with the establishing of the commissions all problems will be settled immediately and all rates reduced. Unfortunate indeed is the commission that shares in such belief. The really successful commissions, and the ones which have enjoyed the best reputation, are the commissions that have considered that a period of preparatory regulation must be allowed, and that their main duty in this preparatory period consists in making such orders that the public service companies can adjust themselves to the new set of theoretical conditions which heretofore have not obtained. This is not at all a new theory. Wisconsin and the Second District New York Commission have undoubtedly had this idea in mind in all of their regulation. The Massachusetts Commission has always refused to accept the modern theory of valuation as a panacea for troubles and, for a period of over twenty-five years, has attempted to regulate the companies under its jurisdiction to the point where they could accept the theoretical regulation without having an undue burden placed upon them.

"It is a striking fact that the Massachusetts Commission, which started to regulate electrical companies in 1887, has not yet completed its work of adjusting the companies under its jurisdiction, and that this preparatory period is still in existence. Yet some of the new commissions may attempt, immediately upon their appointment, to apply in important cases the most theoretical regulation, and hopefully to trust that the company will survive.

VALUATION

"Few companies have valued their own plants, and when the commission is confronted by a rate problem some of the laws require that it must solve the problem by valuing the plant of the utility. The result of a valuation is a matter in which engineers honestly disagree in most cases by about 50 per cent, and the Supreme Court says the subject is still up in the air. The commission might better establish a joint valuation board which would have the confidence of both the commission and the companies. Such a board without any undue haste could begin to establish values throughout the state where such work was considered absolutely necessary or required by law. The men in charge of such valuation should be men of experience and integrity, and the bases of valuation should be carefully worked out. The history of the utilities should be fully studied, and every element of value should be investigated.

"Capitalization as it exists should be considered not as a crime committed by the company, but as a method of finance heretofore approved and often encouraged by the laws of the state. If there are any elements in the capitalization which cannot be approved in the future, the commission should provide means for the gradual amortization of such capitalization during the preparatory epoch of its regulation. Through it all there should be the greatest amount of co-operation between the companies and the commission. The advice of the ablest utility operators in the state should be frankly sought and considered by the commission in the effort to reach the second epoch of theoretical regulation as early as possible.

DEPRECIATION

"Many companies will be found to have no depreciation funds or inadequate ones, generally through a lack of surplus income rather than any direct intent. The commission must now start to help such companies build up their funds to a normal position. And here a liberal policy will be the best. It is always a most difficult matter to build up a depreciation fund, and both the public which is being served and the company are better off if a fund is too large rather than too small. Any minute discussion of the advantages of such theories as the sinking fund basis or straight line basis, etc., in the early preparatory epoch is entirely out of place, and the commission should direct that depreciation funds be built up just as fast and just as liberally as the rates will allow.

RATE OF RETURN

"Utility companies of the country have in general been operating since their establishment upon the usual commercial basis, which has made a virtue of making as much money as is possible. The modern theory of regulation demands that, as utilities are monopolies, the commercial basis should be discarded and a strict and definite rate of return should be established immediately. The municipalities generally, and the commissions sometimes, entirely neglect to consider that this means a complete reversal of the entire financial and executive policy of the company, and if the newer policy is a good one and is to be maintained, commissions should again make such adjustment as would allow the companies in their financial transactions slowly but gradually to accommodate themselves to the stated rate of return. The public in the end is better served by liberality on this score, even if such liberality is only temporary, than it would be by a ruling so drastic that it would injure the financial stability of the company and make future extensions and development difficult."

Determination of Probable Operating Revenue

An Analytical Study of the Probable Operating Revenue of a Proposed Interurban Railway, Based Upon an Examination of Results Obtained from Typical Existing Lines

BY LOUIS E. FISCHER, CONSULTING ENGINEER, ST. LOUIS, MO.

More than 20,000 miles of electric suburban and interurban railways are now in operation in the United States, and their operating records for the most part are available in various state commission reports or can be obtained from other sources. Nevertheless, there is little information of actual and established value so compiled as to be useful to the great number of persons, residing in almost every community, who are promoting, or are encouraging the promotion of, electric interurban railways. That is the purpose of this study. But, before any conclusions can be drawn, it will be necessary to define exactly what is herein to be considered as an electric interurban railway, in order to have a definite foundation upon which to base further discussion.

DEFINITIONS

An electric interurban railway is an electrically operated line connecting two or more independent distant communities and organized and operated to carry passengers, baggage, United States mail, express and freight in broken shipments. It is distinct from an urban or a suburban railway, in that the latter serve only the inhabitants of a city, or of a city and its suburbs, for the purpose of carrying passengers and their ordinary hand baggage. It also differs from a commercial railway in that it neither carries on nor undertakes to carry on a general bulk and interchange freight business.

This division of the electric railway field into four parts, urban, suburban, interurban and commercial, and the stating of the lines of demarcation between interurban lines and the others does not complete the analysis. Even when the three other classes have been eliminated, it will be found that the residual railways, although properly termed electric interurban railways, still possess diverse characteristics that necessitate a further subdivision. As a most comprehensive and yet clear-cut classification I shall adopt that of "the normal" and "the abnormal."

The general characteristics of a normal electric interurban railway are as follows: (1) entrance into cities, towns and villages by franchises over streets; (2) private right-of-way outside of cities and villages; (3) roadbed constructed with reasonable curves and gradients; (4) track laid with 70-lb. or 80-lb. rail and standard ties, 2-ft. centers; (5) power house of ample size and constructed for economical operation; (6) car equipment ample and of modern type; (7) well-constructed primary distributing system and overhead, or third-rail, secondary distributing system; (8) substantially hourly service, with local trains operating alternately with limited trains and limited schedule practically equal to the local schedule of the competing steam railway lines; (9) one or more broken package freight movements each way per day, and (10) a rate of fare approximately 2 cents per mile, with a reduction of from 10 to 25 per cent on round-trip tickets.

The abnormal electric interurban railway has one or more of these characteristics: (1) no entrance into the principal cities served; (2) construction on highways; (3) roadbed of such curves and gradients as to constitute a barrier to the procurement of a reasonable portion of the available business; (4) track construction such as to constitute a similar barrier; (5) power house inadequate and unsuited to generate current at reasonable cost; (6) car equipment obsolete, insufficient and uncomfortable; (7) insufficient primary and secondary distributing systems to maintain reasonable voltage for movement of cars; (8) two-hour, or less frequent, service, and (9) no broken package freight movements.

These, then, are the distinguishing points of the two types of electric interurban railways, the normal and the abnormal. The same differentiation, however, may be made in the case of the territories served as with the electric interurban railways themselves.

A normal territory is made up of cities, towns and villages which are supported by varied agricultural, manufacturing or mining industries, and which are free from the fluctuating influences of summer, health or amusement resorts or other similar traffic-creating centers, and which are also free from serious business depressions due to local industrial conditions.

An abnormal territory, on the other hand, is composed of cities, towns and villages, one at least of which is a large pleasure-drawing center, or is in a state of industrial decay due to local conditions, or is located where the principal industries are of such a nature as to be subject to long periods of business depression or to unsettlement brought about by prolonged strikes.

OPERATING REVENUE

The Interstate Commerce Commission, in accordance with Section 20 of an Act to Regulate Commerce, has prescribed a classification of the operating revenues of electric railways as follows:

General accounts:

I. Revenue from transportation.
II. Revenue from operations other than transportation.

Primary accounts:

I. Revenue from transportation:
- (1) Passenger revenue.
- (2) Baggage revenue.
- (3) Parlor, chair and special car revenue.
- (4) Mail revenue.
- (5) Express revenue.
- (6) Milk revenue.
- (7) Freight revenue.
- (8) Switching revenue.
- (9) Miscellaneous transportation revenue.

II. Revenue from operations other than transportation:
- (10) Station and car privileges.
- (11) Parcel-room receipts.
- (12) Storage.
- (13) Car service.
- (14) Telegraph and telephone service.
- (15) Rents of tracks and terminals.
- (16) Rents of equipment.
- (17) Rents of buildings and other property.
- (18) Power.
- (19) Miscellaneous.

RELATION BETWEEN "REVENUE FROM TRANSPORTATION" AND "REVENUE FROM OPERATIONS OTHER THAN TRANSPORTATION"

Very few of the existing electric interurban railways earn an appreciable amount of revenue from operations other than transportation, except through the sale of power. It is quite usual for an electric interurban railway to serve a territory from which considerable revenue can be earned by the sale of power, but as the development of this item of earning is very dependent on the management of the property, and therefore not general, it will be eliminated from further consideration.

RELATION BETWEEN "PASSENGER REVENUE" AND "OTHER THAN PASSENGER REVENUE," POWER SALES ELIMINATED

The one section of the general accounts, revenue from operations other transportation, being thus considered a negligible quantity in this discussion, there is left the other main heading of revenue from transportation. The most natural question arising in this connection is in regard to the relation of the passenger revenue to the other revenue, such as that from baggage, freight, express, etc. The following table on this point has been prepared for ten cases indiscriminately selected from normal roads serving normal territories:

TABLE I—SHOWING "PASSENGER REVENUE" AND "OTHER THAN PASSENGER REVENUE" FOR TEN TYPICAL SELECTED CASES

Case	Passenger Revenue	Express, Freight and Other Non-Passenger Revenue	Total Gross Revenue	Percentage Express and Freight to Gross Revenue
(1)	$405,979	$5,720	$411,698	1.384
(2)	1,210,170	77,992	1,939,521	5.597
(3)	570,632	35,923	606,555	5.922
(4)	823,346	13,977	858,135	1.618
(5)	286,185	28,212	355,077	9,855
(6)	872,566	86,467	959,033	9.016
(7)	930,600	137,618	1,068,219	12.882
(8)	346,205	59,685	405,890	14.704
(9)	498,994	121,574	620,568	19.580
(10)	197,405	37,111	234,516	15.821
Average	$614,208	$60,428	$691,321	8.732
Average on 243,229 miles of steam road in 1911:	631,340,776	2,155,338.840	2,786,679,616	77.344

From the typical cases above tabulated it is apparent that the predominating item in the revenue account of electric interurban railways is passenger revenue. In the present stage of development of such lines, with their limited operations in the express and freight fields, all the items composing revenue from transportation are of such little consequence compared with passenger revenue that only the latter will be considered in this general review.

POSSIBILITY OF GENERAL FREIGHT BUSINESS FOR ELECTRIC INTERURBAN RAILWAYS

The electric interurban railway, as we have defined it, maintains only an express and broken package freight service, yet in the mind of the public there is a good opportunity for it to take up a general freight service. In view of this misconception of the true sphere of the electric interurban railway and the exaggerated ideas of the possibilities for extensions of electric railway activities along such a line it will be well to point out briefly at this point the fundamental elements that are essential to a road which engages in a general freight traffic.

General freight traffic involves the movement of commodities in carload lots in reasonable numbers, with reasonable frequency, from the producer to the consumer, independently or jointly with other carriers by interchange agreement. To make such a movement independently, both the producer and consumer must be served by the line. On the other hand, to carry on such a movement jointly with other carriers involves interchange relations with these carriers in the making of which electric interurban railways are handicapped by the fact that they are mostly parasites of the pioneer steam railroads in the sense that they serve the same territories by parallel lines and compete to a certain degree for the same traffic. Even though the interchange relations with other carriers exist, still the superior facilities of the steam railroads make it difficult for the electric interurban railways to procure any material portion of the available business.

The point may be raised that electric interurban railways serving large cities qualify for a general freight traffic in the sense that they have both the producers and consumers of bulk freight in the territory served by them. This is true, but as electric interurban roads generally enter their terminals over the city streets, the producers and consumers of bulk freight can be served by them only through the medium of transfer wagons. The steam railroads, on the contrary, almost invariably serve the industries over their own switch tracks and thereby place the electric interurban railway at a tremendous disadvantage.

On the assumption, however, that an electric interurban railway has a lack of destructive steam road competition and such liberal franchises as will enable it to engage in the general freight traffic, still the question of the proper construction and equipment to handle such traffic is not a small one. The movement of trains of freight cars involves a far more elaborate power system and diversity of equipment than does the movement of trains of cars of one or two units handling merely passenger, express and light freight traffic. The additional cost of providing the necessary power appliances and freight equipment, together with the handicaps encountered in procuring any great volume of bulk freight traffic, constitutes a barrier against engaging in such traffic which very few of the electric interurban railways have attempted to surmount. Some electric railways have developed into commercial railways by engaging in the bulk freight traffic, but they are not procuring such economical results as will lend much encouragement to the promotion of new lines on the theory that the freight traffic revenue can be made a material part of the total gross revenue.

RELATION EXISTING BETWEEN OPERATING REVENUE AND POPULATION SERVED

The preceding discussion has emphasized the point that the substantial part of the revenue of electric interurban railways has come, and, on account of the peculiar limitations of these lines, must generally come, from the passenger traffic. It follows logically therefrom that the character of the population served by such lines has a distinct bearing upon operating revenue. Hence, an analysis of the population into its characteristic components is a quite necesssary step in establishing the details of this relationship.*

The population served by an electric interurban railway, other than its tributary farming population, may be divided into three general classes, as follows: primary terminal population, secondary terminal population, and intermediate town and village population. The primary terminal population consists of the population of the principal city into which the railway operates—in other words, the population of that city which is of the greatest commercial importance in the sense that it is a metropolis for the greater portion of the system served. The secondary terminal population is the population of the other important terminal or terminals, exclusive of the principal terminal, which are also of such commercial importance as to attract business from a considerable portion of the territory served but not to the same extent as the principal terminal. The intermediate town and village population is made up of the population of cities, towns and villages served by the line, beyond and between (when there are both primary and secondary terminals), but not including the primary and secondary terminals.

The tributary farming population residing within the territory served by the line is excluded from consideration in the above triple division. The reason for this is that in a normal farming territory the value of this tributary population from the viewpoint of its traffic productiveness is reflected in the size and character of the towns and villages which constitute the intermediate town and village population.

Much importance has been attached to the density of the farming population, and it has been quite customary to approximate its aggregate within arbitrary distances of the line, varying from 1 mile to 4 miles. Aside from the fact that such estimates are extremely crude, there are so many local conditions which influence the extent of the

*The most reliable data of the statistics of population are the United States census reports. These census reports should be used as a basis for determining the population, allowing reasonable growth, predicated on some known existing condition, since the date of the last census.

zone limiting the tributary population that no uniform principle for considering its value on that basis can be established. On the other hand, the towns and villages constituting the intermediate town and village population will reflect all of the characteristics of the farming community that contribute to their support. If such a territory has fertile lands, it will support a greater number of townspeople, and if the roads are good in a farming community, the sphere of the commercial activities of the town will be increased and a larger population will result. Even though a town or village may be largely developed because of manufacturing or mining industries, yet to the extent that it has been supported by the tributary farming population it will reflect with reasonable accuracy the value of the farming population as to its traffic productiveness.

The tributary farming population being thus eliminated from discussion, we have, as stated above, the threefold division of the population served by an electric interurban line into the primary terminal, the secondary terminal and the intermediate town and village populations. The character of each of these has an important bearing upon the

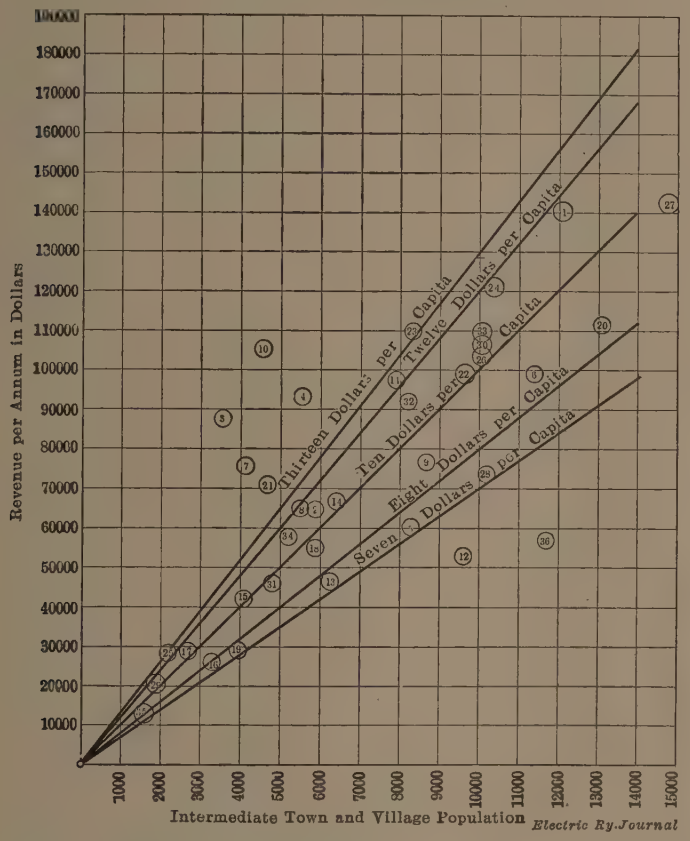

Revenue per Annum in Dollars
Intermediate Town and Village Population
Thirteen Dollars per Capita
Twelve Dollars per Capita
Ten Dollars per Capita
Eight Dollars per Capita
Seven Dollars per Capita
Electric Ry. Journal

Chart Showing Relation Between Revenue and Intermediate Town and Village Population

operating revenue of the serving line, but it is the various phases of the traffic movement created between these divisions by the intercommunication of inhabitants that more effectively illustrate the relation between operating revenue and population served.

The traffic created by the population of an electric interurban railway may be said to be consequent to the following general movements:

Source I:

(a) The intercommunication of the population of the primary terminal and the intermediate population served.

(b) The intercommunication of the population of the intermediate centers only.

Source II:

(c) The intercommunication of the population of the secondary terminals and the intermediate population served.

(d) The intercommunication of the population of the primary terminal and the population of the secondary terminals.

(e) The intercommunication of the population of the secondary terminals alone (if more than one).

It will be noted that the traffic created by (a) and (b) of Source I is consequent to the existence of the primary terminal and the intermediate population, while the traffic created by (c), (d) and (e) of Source II is consequent to the existence of the secondary terminal population.

STATISTICS OF REVENUE OF LINES PRODUCTIVE OF EARNINGS ONLY FROM SOURCE I

In tracing out the relation between the population served and operating revenue, we shall discuss first the case of electric interurban railways having traffic movements arising from Source I, or from a primary terminal and intermediate town and village population but no secondary terminal. The following table has been compiled from ten cases indiscriminately selected from normal roads of this class serving normal territories:

TABLE II—SHOWING STATISTICS OF GROSS OPERATING REVENUE OF TYPICAL LINES WITH A "PRIMARY" TERMINAL AND INTERMEDIATE POPULATION, BUT NO "SECONDARY" TERMINAL

Case	Location	Miles of Track	Primary Terminal Population	Intermediate Town and Village Population	Gross Operating Revenue
(1)	Iowa	76	86,368	12,071	$140,120
(2)	Michigan	16	13,194	5,811	64,839
(3)	Missouri	22	248,341	3,633	88,889
(4)	New Jersey	18	44,461	5,506	92,146
(5)	New Jersey	15	8,336	8,173	59,317
(6)	New Jersey	17	13,298	11,223	99,346
(7)	New York	17.6	11,504	4,040	75,023
(8)	New York	16.5	37,176	5,458	64,958
(9)	New York	12.5	6,420	8,651	77,215
(10)	West Virginia	19.3	41,641	4,589	105,394
(11)	Connecticut	13	13,502	7,882	96,869
(12)	Connecticut	50	133,605	9,517	52,379
(13)	Connecticut	11	19,659	6,213	46,732
(14)	Oklahoma	17	13,000	6,312	66,750
(15)	Illinois	11	14,548	4,055	41,776
(16)	Illinois	19	6,090	3,191	25,516
(17)	Illinois	12.5	22,789	2,700	29,585
(18)	Illinois	14	11,456	5,884	54,300
(19)	Illinois	7	8,102	3,926	29,175
(20)	Indiana	32	24,005	13,053	111,048
(21)	Indiana	23	63,933	4,671	70,618
(22)	Indiana	31	19,359	9,701	99,200
(23)	Indiana	25	69,647	8,300	109,851
(24)	Ohio	25.5	18,266	10,330	121,109
(25)	Ohio	24	5,222	2,227	29,000
(26)	Ohio	53	364,403	10,068	104,000
(27)	Ohio	38	20,387	14,986	142,000
(28)	Ohio	20	46,921	10,136	72,984
(29)	Ohio	18.5	9,076	1,855	20,800
(30)	Ohio	51	116,577	10,034	106,656
(31)	Pennsylvania	19	12,623	4,788	46,376
(32)	Pennsylvania	36	5,749	8,073	91,347
(33)	Pennsylvania	20	1,556,231	10,223	108,186
(34)	Pennsylvania	31	87,411	5,088	58,430
(35)	Pennsylvania	10	5,474	1,640	13,705
(36)	Massachusetts	20	6,740	11,794	58,433

The above statistics indicate:

(1) That the length of the road and the amount of the operating revenue have no direct relation with each other from which analytical deductions can be drawn;

(2) That the size of the primary terminal has no material influence upon the amount of operating revenue; and

(3) That approximately the operating revenue varies directly with the aggregate of the intermediate town and village population. This is graphically set forth by the chart on this page.

By reference to this chart it will be noted that out of the thirty-six roads tabulated twenty-two are within the limits of the lines representing an earning per capita of intermediate town and village population of between $8 and $12, and that all but seven of these cases are within the limits of the lines representing an earning per capita of town and village population of between $7 and $13. It will furthermore be noticed that the relation between the average earnings of the thirty-six cases cited and the town and village population is approximately represented by the line indicating $10 per capita of intermediate town and village population.

Attention is again directed to the fact that the above deductions are made from the operations of normal roads serving normal territory, and therefore they will be very misleading if applied to abnormal lines or abnormal territories. It is not intended, however, to imply that a normal electric interurban railway serving a normal territory that is productive of revenue from only Source I will earn $7, or $10, or $13 per capita of intermediate town and village population; indeed, the fact that these limits are sometimes exceeded is clearly indicated in the chart. It is clearly shown, however, that the earnings, in all probability, will vary between $7 and $13 per capita of intermediate town and village population and that the general average is approximately $10 per capita of that population.

Statistics of Revenue of Lines Productive of Earnings from Sources I and II

Table II and the discussion of it have served to show the relation between population and revenue for electric interurban railways deriving earnings from Source I only. We shall now consider a combination of Source I and Source II and statistics assembled for railways having a primary terminal, one or more secondary terminals and an intermediate town and village population. The cases in Table III have also been indiscriminately selected from normal roads serving normal territories.

Table III—Showing Statistics of Typical Lines with a Primary Terminal, One or More Secondary Terminals and an Intermediate Town and Village Population

Case	Miles of Track	Primary Terminal Population	Secondary Terminal Population	Intermediate Town and Village Population	Gross Operating Revenue
(1)	28.5	20,367	8,696	2,723	$84,522
(2)	32	25,976	7,353	2,150	118,000
(3)	130	2,185,283	55,783	35,400	1,210,170
(4)	93	233,650	20,081	26,879	428,456
(5)	40	19,359	17,010	2,700	152,535
(6)	320	233,650	62,650	112,097	1,899,706
(7)	65	63,933	37,655	7,642	257,868
(8)	39	12,687	10,480	5,439	135,748
(9)	41	223,928	6,305	4,625	123,863
(10)	32	8,981	13,650	7,364	306,962
(11)	82	31,297	11,080	1,695	91,219
(12)	199.5	423,715	31,770	14,711	858,135
(13)	67	74,419	9,491	12,443	207,150
(14)	36.4	50,217	24,026	4,892	222,110
(15)	26	18,266	5,501	6,582	118,292
(16)	222	560,663	49,651	74,146	1,068,219
(17)	150	560,663	228,194	36,023	1,009,638
(18)	122	704,428	51,678	39,006	664,607
(19)	95	31,140	38,189	13,163	420,690
(20)	40	66,950	25,768	2,477	235,665
(21)	40	51,678	31,140	4,853	247,663

It will be remembered that the general conclusion derived from Table II was that the approximate general average of operating revenue for lines during their traffic only from Source I was $10 per capita of intermediate town and village population. Using this approximate figure as a basis for an estimate of earnings from Source I in Table III, we can by subtraction arrive at the portion of earnings attributable to Source II in Table III. The last column in Table IV, therefore, shows the per capita revenue of secondary terminal population. The average distance between terminals is also included.

The statistics in Table IV indicate:

(1) That the length of road has in this case, as in the previous case, no relative bearing (from which any conclusions can be drawn) on the amount of operating revenue from Source II;

(2) That the operating revenue from Source II is not governed by the population of the primary terminal, and

(3) That the relations existing between revenue from Source I and the intermediate town and village population, heretofore shown, do not exist between the revenue from Source II and the intermediate town and village population.

The reason why the same relationship does not exist between the intermediate town and village population and the reveune derived from Source I and Source II, respectively, is obvious. A road operating between a primary terminal and a secondary terminal, through an intermediate town and village population, will not obtain materially different results in so far as they relate to the earnings contributed by the population of the intermediate towns and villages than a road serving merely a primary terminal and an intermediate town and village population. The reason for this is that the average inhabitant of the intermediate towns and villages, if but one terminal is available to him, will direct his attention to that terminal, whereas if two terminals are available he will travel sometimes to one and sometimes to the other. Hence the sum total of the revenue derived from his patronage is approximately the same in each instance; consequently, as the revenue from Source II per capita of intermediate town and village population increases, the revenue from Source I per capita of intermediate town and village population decreases, and the approximate per capita average of $10 previously obtained is affected accordingly.

On the other hand, the table discloses the fact that the revenue from Source II per capita of secondary terminal population does not vary so widely as it seems to do from a casual examination of the table. As the earnings from Source II are essentially created by the existence of one or more secondary terminals, it is reasonable that there should exist some approximate relation between the amount of this revenue and the entire population of the secondary terminal, or secondary terminals, served. If the average distance between terminals is taken into consideration, as well as the character of the terminals, these relations may be readily brought out by a study of Table IV, and we may sum them up in the form of two general postulates:

(1) The greater the average distance between terminals the less the revenue from Source II per capita of secondary terminal population.

That this should be the case is logical from the fact that electric interurban railways paralleling steam railroads will procure for short distances, say 40 miles or less, practically all of the passenger traffic, owing to the frequency of service and the convenience of its operation over the city streets into the heart of the city. For distances greater than 40 miles, the presumed greater hazard, discomfort or loss of running time of the electric lines as compared with the steam lines results in the proportion of the traffic which the electric lines procure being gradually diminished as the distance increases.

(2) The second postulate deduced from Table IV has to do with the drawing facilities of the terminals rather

Table IV—Showing Statistics of Roads Listed in Table III, but with Revenues Divided Into Those from Source I and Those from Source II.

Case	Miles of Track	Average Distance Between Terminals	Total Gross Revenue	Estimated Revenue Source I	Estimated Revenue Source II	Revenue from Source II per Capita of Secondary Terminal Population
(1)	28.5	28.5	$84,522	$27,230	$57,292	$6.60
(2)	32	32	118,000	21,500	86,500	12.00
(3)	130	32	1,210,170	354,000	856,170	15.00
(4)	93	60	428,456	268,790	159,666	8.00
(5)	40	24	152,535	27,000	125,535	7.35
(6)	320	50	1,899,706	1,120,970	768,736	12.30
(7)	65	65	257,868	76,420	175,448	4.70
(8)	39	39	135,748	54,390	81,358	8.00
(9)	41	40	123,863	46,250	79,613	12.30
(10)	32	32	306,962	73,640	232,320	17.00
(11)	82	22	91,219	16,950	74,269	6.70
(12)	199.5	40	858,135	147,110	711,025	22.40
(13)	67	30	207,150	124,430	82,720	8.70
(14)	36.4	15	222,110	48,920	171,190	7.12
(15)	26	26	118,292	65,820	53,532	9.70
(16)	222	50	1,068,219	741,460	326,759	6.55
(17)	150	80	1,009,638	360,230	649,408	2.85
(18)	122	100	664,607	390,006	274,601	5.30
(19)	95	50	420,690	131,630	289,060	7.60
(20)	40	40	235,665	24,770	210,895	8.20
(21)	40	40	247,663	48,530	199,133	6.40

than their distances apart, and it is to the effect that the earnings from Source II per capita of secondary terminal population depend largely upon the causes for intercommunication between the various terminals.

It is clear that two comparatively small terminals in close proximity, one a county seat and the other a manufacturing center, will have far greater intercommunication than if both terminals are county seats. Again there will be greater intercommunication per capita in the case of a very large city connected with a nearby substantially smaller city than in the case of one comparatively large terminal, sufficient unto itself, connected by an electric line with another similar large terminal.

GENERAL CONCLUSIONS CONCERNING REVENUE FROM SOURCE II

The above postulates are fundamental generalizations that are easily discernible. But it is very evident, however, that any attempt to set forth an approximate concrete relation between the revenue from Source II and the population of the secondary terminal is an extremely difficult undertaking. Nevertheless, the foregoing statistics and discussions do indicate the following general tendencies governing revenues from Source II:

(1) That where the secondary terminal is removed from the principal terminal a distance of 40 miles or less the revenue from Source II will vary between $6 and $20 per capita of that secondary terminal population, depending upon the causes for intercommunication and the efficiency of the service rendered; and

(2) That when the secondary terminal is removed from the principal terminal a distance greater than 40 miles the revenue from Source II per capita of that secondary terminal population will be diminished practically 10 per cent for each 10 miles of increased distance.

OTHER STATISTICS CONCERNING REVENUE FROM OPERATION, SHOWING SLIGHTNESS OF RELATION BETWEEN REVENUE AND CAR MILES OPERATED

The above tables and discussions have afforded a glimpse of the relation between the population served and the operating revenue of electric interurban railways. It was stated as a conclusion to Table II and Table IV that the length of the road and the amount of operating revenue bear no direct relation to each other from which any analytical deduction can be drawn. Inasmuch as it is customary, however, to use the unit of car-mile revenue in considering the revenue of railroads, it may be well to present here Table V, showing the revenue per car-mile for twenty typical electric interurban railways.

TABLE V—SHOWING REVENUE PER CAR MILE FOR TWENTY TYPICAL INTERURBAN ELECTRIC RAILWAYS.

Case	Miles of Track	Gross Revenue	Car Miles Operated	Revenue per Car Mile
(1)	41	$123,863	639,290	$0.1954
(2)	17	66,750	313,498	0.2122
(3)	20	108,186	572,977	0.1886
(4)	25	141,085	474,564	0.2975
(5)	32	107,278	341,542	0.3111
(6)	51	133,240	558,428	0.2385
(7)	38	149,304	648,728	0.2301
(8)	46	230,142	1,052,089	0.2166
(9)	23.7	70,618	191,674	0.3684
(10)	40	145,689	638,987	0.2284
(11)	320	1,899,706	5,852,994	0.3081
(12)	101	546,980	2,294,714	0.2383
(13)	62	405,890	1,307,924	0.3103
(14)	122	620,568	2,146,413	0.2889
(15)	40	234,516	818,425	0.2865
(16)	32	101,993	341,542	0.2986
(17)	222	1,068,219	3,818,028	0.2965
(18)	30	67,416	367,460	0.1985
(19)	170	999,274	3,276,608	0.3083
(20)	45	355,469	923,705	0.3826

This table, with its utter lack of uniformity in revenue per car mile, amply illustrates the futility of attempting to estimate revenue on this unit basis for electric interurban railways. The revenue per car mile will naturally be dependent upon the frequency of service, which, on the other hand, depends upon the judgment of the management and also upon the demands of local conditions. Furthermore, the question of multiple-unit operation enters into the subject of average earnings per car mile, as does also the question as to whether the traffic is balanced, that is to say, the extent of the equality of movement in opposite directions.

COMPARISON OF ELECTRIC INTERURBAN AND STEAM RAILWAY REVENUES

The average gross revenue per car mile of track on 243,229 miles of steam railroads in 1911, according to the statistics of the Interstate Commerce Commission, was $11,589, of which $2,708 was derived from passenger traffic. Similar statistics for electric interurban railways are not available, but from the records of the typical cases listed in Table V, which may be said to be representative of all roads qualifying as electric interurban railways under the definition hereinbefore given, the average gross revenue per mile of track is $5,130.

While these figures are interesting from the viewpoint of disclosing the relative earning power of steam rail-

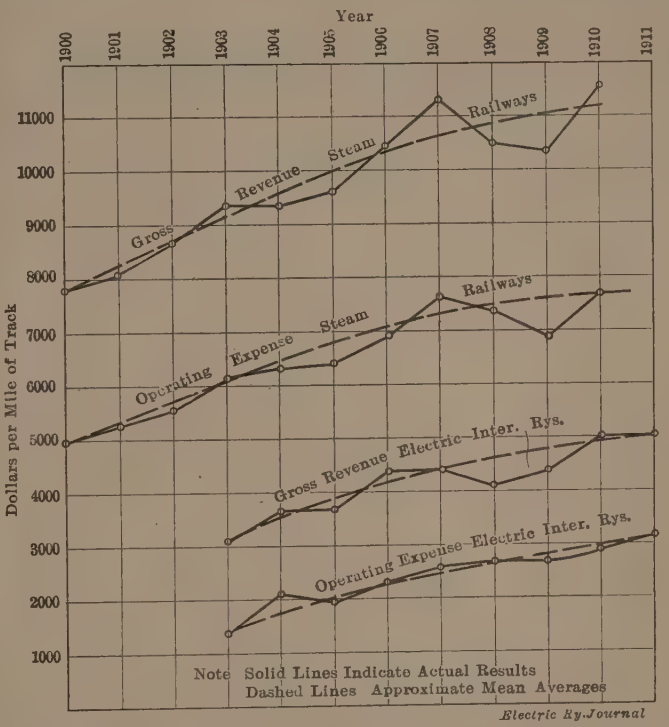


Chart Showing Relation of Tendency of Growth of Operating Revenue and Expense of Interurban Railways Compared with Steam Railways

roads and electric interurban railways, they are of little importance on account of the different conditions prevailing in the two fields. The electric interurban railways, deriving substantially all of their revenue from passenger traffic sources, are limited to sections of dense population where large passenger traffic exists. Steam roads, deriving a large percentage of their revenue from freight sources, are not limited to such restricted areas and have been located more especially for the primary purpose of developing freight traffic. Therefore, that the earnings of the electric interurban railways should be considerably higher than the passenger revenue of steam roads and considerably less than the gross revenue of steam roads is but a logical result.

The chart on this page graphically discloses the growth of the average revenue and operating expense per mile of track per year of the steam railroads as compared to that of the electric interurban railways. The statistics of the steam lines are again taken from the report of the Interstate Commerce Commission, while those of the electric interurban railway have been gathered from the operating statements of a number of typical lines.

From this chart it is obvious that the growth of revenue

per mile of track on electric interurban railways is not keeping pace with that of steam railroads. It appears also that the operating expense per mile of track on the steam railroads has not increased as rapidly as the revenue on these lines. This has resulted in a gradual increase in the net revenue per mile of track derived from steam railroad operation. The growth of operating expense on electric interurban railways, however, has substantially kept pace with the growth of revenue per mile of track, with the result that the increase of net revenue per mile of track on electric railways has been very little and was less in 1911 than in 1910.

One of the characteristics of electric interurban railways the mileage of which has not been extended from time to time is that the available revenue was quickly developed and that at the end of this period the revenue has increased at a very low rate. This is not especially revealed by the chart on page 305, owing to the influence which the constantly increasing mileage has had on the revenue of the cases used in preparing the chart.

CONCLUSION

The generally accepted, and doubtless the best, method of determining the probable revenue of a projected line is to apply to determinable units of population of the projected line the known unit results obtained by operating roads whose type of construction and method of operation and the general characteristics of whose territory are in all respects similar to and comparable with homologous attributes of the projected road. In using already existing roads to determine the feasibility of a projected line, however, care must be exercised in determining the equality of conditions and in making corrections to compensate for differences productive of change in the revenue results. In view of previous discussion as to the relation between operating revenue and the population of the territory served, it is obvious, too, that careful consideration must be given to the distribution of the population as well as to the amount thereof.

The greatest point of interest in the contemplated establishment of an electric interurban railway is, of course, the probable revenue. The final determination of this should in general be left to those who have expert knowledge of such matters and whose judgment and discriminating discernment of the valuation of varying elements affecting revenue is of the highest character. It is possible, however, for the layman by an intelligent application of the rules governing the approximate relations existing between the revenue and the population served, as heretofore established, to determine, within reasonable limits, the probable revenue that normal interurban railways can obtain in normal territories, and in this way to determine approximately whether the projected line is fundamentally good or fundamentally bad from the point of view of the investor.

FURTHER DISCUSSION

Thus far our study of the factors underlying the successful electric interurban railways of to-day has been confined, outside of the necessary preliminary steps of definition, to an analysis of the principles that govern or affect the operating revenue of such lines. To stop at this point would be an inadequate treatment of the main subject of electric interurban railways, for in importance little if any below operating revenue come operating expense and cost of construction. These two points and the economic relations between them and the first offer wide fields from which generalized information may be obtained. Hence by means of the two articles to succeed this one, the first dealing with operating expense and cost of construction and the second with general economic relations and a hypothetical case, the promoter and the investor should be materially aided in their judgment of the merits for investment purposes of projected electric interurban railways which may be brought to them for their consideration.

COMMUNICATION

A QUESTION OF NAMES

McHenry & Murray, Engineers,
New Haven, Conn., Aug. 16, 1913.

To the Editors:

Doubtless the communication from Mr. de Muralt published in your last issue was written to provoke some discussion. The sense of humor that must unquestionably pervade all those who have read it justifies one, at least, in swimming away with the bait, and speaking of bait suggests water, and water suggests a picture that I saw in one of the recent issues of *Life*. An upturned boat was depicted about a mile from shore, in appropriate surroundings, such as high waves, seagulls, etc., and seated on the top of the boat, hanging on to the centerboard, was the skipper. The friend who had intrusted himself for a sail was exceedingly wet—at least it is assumed that he was, as he was up to his neck, hanging on the rudder, trying to reach his hat that was floating away. To the erstwhile skipper he was shouting the remark: "Say, I thought you said you knew how to sail a boat," to which came the tart reply: "Well, aren't we a mile from where we started? What do you think I have been doing—playing golf?"

Three-phase motors taking power from a single-phase contact wire bear about as much relation to the "so-called" three-phase system as the man on the centerboard in the foregoing picture does to a good skipper. It is clear that Mr. de Muralt wants to "start something," but it really cannot be done for the reason that every man who has had any real knowledge of the application of single phase to railroading knows that there is nothing to be saved by its use in so far as the power station or the locomotives *per se* are concerned. The single-phase system is justified only in virtue of the real determining economies obtained in its distribution system. Should Mr. de Muralt by any chance in the near future happen to see four radically different types of electric locomotives passing on the tracks of the New Haven Railroad, since he believes that a system should be named by the type of locomotive, would he not be compelled to classify the New Haven electrification as a "single-phase a.c.-d.c., split-phase, mercury-rectifier system"? This reference to induction motors and mercury-arc rectifiers is, of course, intended for an illustration only, as neither of these types is under consideration.

The great flexibility of the single-phase distribution system makes such an event perfectly possible, and therefore we will all agree, except possibly Mr. de Muralt, that a system derives its name from that feature in it which is at once its most valuable and distinguishing characteristic. Hence I cannot see that the editors of the Electric Railway Journal have in any way gone astray in entitling their article "Single-Phase Traction for Norfolk & Western Railroad."

Wm. S. Murray.

An ambitious motor omnibus program has been started in England under the name of the Greater Omnibus Services, Ltd., with the intention of operating motor omnibuses in most, if not all, the larger provincial towns in Great Britain. Stewart Alfred Curzon, who also represents the General Omnibus Supply, Ltd., has contracted to procure from the London General Omnibus Company a fleet of De Diva omnibuses (whether old or new is not specified) now in use by the London General Omnibus Company, and operate them outside a radius of 30 miles from Charing Cross. Applications are invited for a first issue of 135,000 ordinary shares at £1 each at par and 3000 6 per cent first debentures at £1 par, or $1,050,000 in round numbers, for the purpose of getting the plan started. The plan is not looked upon with favor by the municipal authorities in the various towns which own their tramway systems.

REPAIRING COLLECTOR RINGS OF ROTARIES

BY H. ROOT PALMER, GENERAL SUPERINTENDENT OF LIGHT & POWER VIRGINIA RAILWAY & POWER COMPANY

The following particulars relate to an effective plan followed by our company in repairing collector rings on six-phase rotaries.

The castings are made sufficiently long to get three rings out of each. The rings are turned up in the lathe and bored to six different sizes to correspond to the rings on the rotaries. Each successive ring, beginning with the first, is made about 1/32 in. larger in the bore. The casting is roughed out on the outside diameter, and sufficient metal is left to permit the new ring to be turned up with the old ring.

When the rings are ready to be placed, the turning tool is put in position and the old rings are turned down to the

Collector Rings of Richmond Rotary Converter

proper diameter, the inside ring being the largest. An allowance of 1/16 in. is made for shrinkage. When the rings are ready the end bearing of the rotary converter is removed and the rings are slipped over the shaft.

The rings are heated and two sets of blacksmith tongs, made specially in our own shop, are used for lifting the ring and setting in place. To prevent unsoldering the electric connection to the collector ring, cold water is used to cool the ring after it is in place. Water put on with cotton waste will do no harm. After the rings are in place the bearing is put back and the rings are turned up.

An extra brush holder with a lubricated carbon brush is installed in addition to the copper-leaf brush to keep the collector rings lubricated and also to prevent the copper-leaf brush from cutting. The castings are composed of 82.8 per cent copper, 13.8 per cent tin and 3.4 per cent zinc. The material is furnished by the company and cast at a local foundry.

Rings made in this manner have been in use since the end of 1911 without the slightest trouble or appreciable wear. This plan was worked out by J. P. Keeney, power house engineer, Norfolk, Va., and its cost is approximately one-sixth of that of new rings.

TESTS OF WOODEN POLES REINFORCED AT GROUND LINE

Some interesting tests were conducted in Pittsburgh on July 30 and 31 by the Pittsburgh Reinforcing Pole Company to determine the breakdown limits of poles which had been equipped with its Orr reinforcing collar. In this

Cracking of Reinforcement Under Excessive Loading

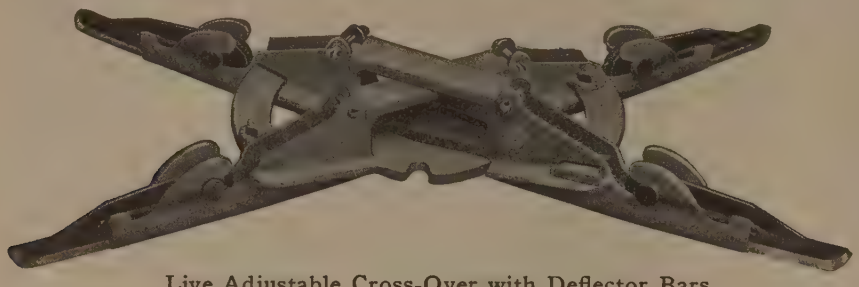
system of prolonging the useful life of a wooden pole, a collar and sleeve of concrete reinforced with rods and expanded metal are applied at the ground line—the part which is must subject to decay. The poles under test comprised five 40-ft. and ten 30-ft. chestnut and ten 30-ft. cedar poles which a certain company had reinforced several months before in accordance with the manufacturer's specifications.

When tested, the cedar poles broke off above the reinforcing collar at an average pull of 2000 lb., and the chestnuts at an average pull of 3000 lb. The load was applied 30 ft. above ground on the 40-ft. poles and 19 ft. above ground on the 30-ft. poles. The ultimate strength of the reinforcement was satisfactory, but in nearly every case cracks de-

Reinforcement Surviving Breakage of Pole

veloped in the concrete collars at 1500 lb. The customer expressed the opinion, however, that a steel and concrete reinforcement should be able to withstand a pull of 2000 lb. under similar conditions without developing cracks in the concrete. The poles for the second test were therefore reinforced to meet this requirement by substituting a heavier expanded metal and by adding 1 in. to the thickness of the concrete in the collars and sleeves.

Under test, five of the strengthened 40-ft. poles withstood an average pull equivalent to 2335 lb. applied 30 ft. from the ground before developing any cracks in the collars and withstood a pull of 3040 lb. before failure. In three cases the upper part of the poles split or broke. Six 30-ft. poles stood an average load equivalent to 2444 lb. with a 19-ft. lever arm before developing cracks in the collar and 2961 lb. before failure.



Live Adjustable Cross-Over with Deflector Bars

Bronze Splicer

The average load on the base of the 40-ft. poles was 91,000 ft.-lb. at the time of failure. Eight rods were used in these and four rods in the 30-ft. poles, which withstood 57,000 ft.-lb. As both sizes had the same weight of expanded metal and approximately the same thickness of concrete in the sleeve and collar, the better results on the 40-ft. reinforcements were undoubtedly due to the extra rods. Two poles similarly reinforced were saved to be broken later. Eight other reinforced poles were broken on which reinforcing rods lighter and shorter than the standard rod were used.

The poles were new class B chestnuts, artifically weakened by reducing a section extending 15 in. below the ground to 29 in. in circumference on the 40-ft. poles and 25 in. to 25½ in. on the 30-ft. poles. The original circumference 6 ft. from the butt was between 43 in. and 47 in. on the 40-ft. poles and 33 in. to 38 in. on the 30-ft. poles.

The poles were concreted on June 6, 7 and 9 and were tested on July 30 and 31, having set about fifty-four days. The poles were set in refilled ground and not only yielded rather easily in places during the test, but in one or two instances, probably because of dampness, the concrete did not seem to have set well.

The test was made by making a direct horizontal pull 32 ft. above ground on the 40-ft. poles and 23 ft. above ground on the 30-ft. poles, and the deflection for every 100 lb. pull was registered.

IMPROVED HIGHWAY CROSSING SIGNAL

The unique highway crossing signal developed by the Protective Signal Manufacturing Company, of Denver, Col., has been re-designed to operate with a closed circuit so that any failure in the apparatus or wiring now causes the bell to ring continuously, thus attracting attention at once to the trouble. This crossing signal, as described in the Electric Railway Journal for Dec. 21, 1912, makes use of the fact that the passage of a train or car over any stretch of track sets up a series of vibrations in the rails so that a sensitive oscillator attached to one of them will be set in motion whenever a car is moved in the vicinity. The rigidity of the roadbed is, however, sufficient to prevent anything of less weight than a car from causing any movement of the rail, and in consequence the apparatus cannot be made to give false indications. But whenever the oscillator is set in motion a bell at the crossing is rung and a light is displayed until the train passes the crossing.

RECENT DESIGNS IN OVERHEAD MATERIALS

The Ohio Brass Company, Mansfield, Ohio, has added to its line of overhead materials the cross-over, splicer, section insulator and trolley clamp shown in the accompanying cuts. The cross-over is intended for use at crossings where it is desired not to insulate the wires from each other. The feature of the device is the method of holding the wires in place by means of the cam action of the renewable bronze tips. This principle has been used on O-B frogs for some time and has proved to be not only an efficient means of holding the wire, but also a time-saver for the lineman. The bronze pan and cross-runner castings interlock and are held together without the use of screws or bolts. The installation of the device is simple and is accomplished without cutting of wires.

Two forms are made. Form 1, with malleable-iron deflector bars to prevent a flying trolley harp from being wedged, is used for crossings of from 30 deg. to 60 deg., while Form 2, without deflector bars, is for crossings from 60 deg. to 90 deg., since within these latter limits there is no danger that a harp will catch. For the present these cross-overs will be furnished for No. 00 round, figure 8 and grooved wires only.

Section Insulator

The bronze splicer is an entirely new design known as type C. It is made to combine lightness, strength, clearance for trolley wheel and smooth under-run. The lips at each end of the splicer are bent around the wire to encircle and protect it throughout the entire length. There are no hollow places in the underside to cause arcing. The installation is easy as the wire is practically straight throughout the entire length of the splicer. The holding power of the tool-steel set screws is increased by forcing the wire into slight depressions under each screw.

Pressed-Steel Trolley Clamp

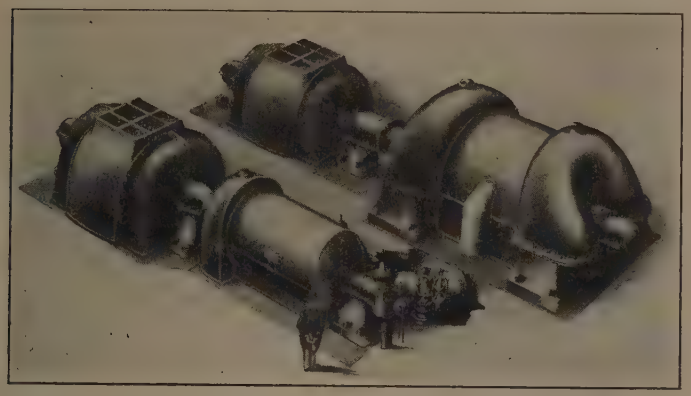
The type A, form 2 section insulator is similar in every way to the well-known type A, form 1, except that it is smaller and lighter. It is recommended for No. 0 and No. 00 round, figure 8 and grooved wires, while the old heavier design is offered for the No. 000 and No. 0000 wires. The insulator is shown with the suspension yoke attached to the boss, but is furnished with the boss only when the insulator is attached to the trolley hanger.

The new trolley clamp is made with a pressed-steel

runner piece, 7¼ in. long, and cast boss. The weight of trolley wire is supported by two small lugs on the boss castings which fit into holes in the runner piece and are held firmly by the screws.

UNIQUE TURBO-GENERATORS FOR THE INTERBOROUGH

The new turbines recently ordered by the Interborough Rapid Transit Company of New York to care for its increased service are unusual not only for their size but also because of the fact that each set will be made up of two units, one operating with high-pressure steam at 1500 r.p.m. and the other receiving the exhaust from the former



Turbo-Generator Set of 30,000 kw for Interborough Rapid Transit Company

and running at 750 r.p.m. Each set will have a combined capacity of 30,000 kw, but owing to the enormous amounts of power required by the whole system the new units will be able to be operated at the most economical load during the major part of the time and therefore they were designed to give the very highest obtainable efficiency, nearly regardless of their cost—the only prior claim to this desideratum being reliability in operation.

Turbines of 30,000-kw capacity may be designed in single units, operating at 750 r.p.m. Such machines would be relatively economical and would probably show a steam consumption performance higher than has hitherto been obtained. The turbine cylinder structure, however, on account of the slow rotative speed, would be relatively large, and this, together with the temperature differences existing within the one structure, would involve in a machine of such large capacity an engineering problem of some magnitude. Similarly, both steam turbine and generator of this capacity might be designed and constructed to operate at 1500 r.p.m. In this case the structure would be less gigantic, but in order to avoid congestion of the steam in the low-pressure portions of the turbine, and to expand efficiently down to the very low limits of condenser pressure, 29-in. vacuum in this instance, blade speeds rather beyond what has hitherto been considered the limit of good practice would be involved. Either of these would be a combination type machine, comprising an impulse element for the first expansion, followed by an appropriate number of reaction elements for the low-pressure stages, the latter being arranged for double flow.

The highest degree of economy, however, is not to be obtained with an impulse element, as compared with a reaction element, provided the steam volumes, speed, etc., are appropriate for the design of the reaction turbine, but in any reaction turbine designed for high-expansion ratios the problem of having to deal with relatively minute volumes of steam at the high-pressure end and enormous volumes at the low-pressure end is serious, the volume of increase being roughly on the order of a geometrical progression. It is evident that if the high-pressure portions of a turbine may be operated at twice the rotative speed of the low-pressure portions, this problem is largely eliminated, and the capacities and speeds in this particular application, where the high-pressure is a single-flow turbine, operating at 1500 r.p.m., and the low-pressure is a double-flow turbine, operating at 750 r.p.m., render it possible to design plain reaction machines which will have an efficiency beyond anything yet constructed. The blade speeds involved are low, and either turbine element is of exceedingly simple mechanical construction, involving no new engineering problems and thoroughly fulfilling the first desideratum of absolute reliability.

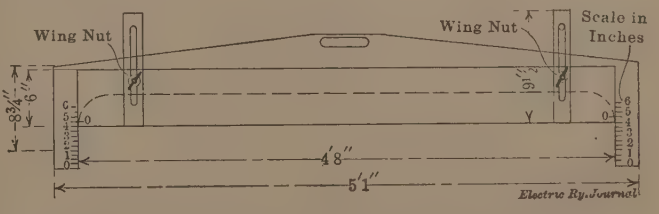
The scheme of employing two turbine elements having the steam pass serially through them is not new. A number of such units of from 1000-kw to 2000-kw capacity were built by the Westinghouse Machine Company in 1901. This construction has again come to the front in the case of the English-built Parsons turbines purchased by but not yet delivered to the Commonwealth Edison Company of Chicago. It is new, however, to employ high-pressure and low-pressure elements driving separate generators, each at a different synchronous speed.

There are other advantages in dividing large turbines into two separate elements besides those due to employing different speeds. The temperature range in either element is reduced. A sufficient number of stages may be introduced to give the very highest hydraulic efficiency without any mechanical difficulties, such as increased length between bearings, etc. Some little advantage is to be gained by separating, between the two turbine elements, the water which has been precipitated in the steam expansion. Either element is more reliable and simple, because of its smaller size. There is some slight loss of efficiency due to the employment of two generators instead of one of twice the capacity, but this is more than overbalanced by the gain in economy due to the two turbine elements operating at different speeds. For want of a better term, these units have been called "cross-compound" machines.

The Westinghouse Machine Company, which is building the new units, has guaranteed that each set will deliver energy at the terminals of the generator equivalent to 75¾ per cent of that available in the steam as worked out on the basis of the Rankine cycle.

PAVING CLEARANCE GAGE

A gage for use in determining the clearance between motor shell and paving has been used on the Syracuse lines of the New York State Railways. It consists of a wooden frame with projecting legs at each end spaced so that the bottoms of both rest on the rails. The frame has a hand



Pavement Clearance Gage for Motor Shell Clearances

grip on the upper edge for convenience in using. A sliding board, 4 ft. 8 in. x 6 in., moves up and down in guides and is clamped to the frame by means of bolts and wing nuts. The inside edges of the frame legs are graduated in inches, and marks on ends of the sliding board indicate the average height of the bottom of the board from the bottom of the feet. In operation all that is necessary is to place the feet on the rails and to push the sliding board down as far as it will go. The gage can then be raised for ease of reading the end scales. Dangerously high paving can thus be detected before it does damage to the equipment.

News of Electric Railways

Franchise Drafted for Metropolitan Street Railway

Mayor Jost of Kansas City, Mo., on Aug. 13 submitted a complete draft of a franchise to the receivers of the Metropolitan Street Railway for their acceptance. The fundamental parts of the Jost franchise have the approval of Mayor Green of Kansas City, Kan., but slight modifications in and additions to the details where they are directly associated with intercity service have been requested. At present representatives of the company and of the city are going over the franchise section by section and clause by clause and working out all points about which there is a difference of opinion. The changes suggested and agreements reached, if such are possible, will be included in a new and final draft of the franchise.

According to Mayor Jost, under the settlement reached by the submission to Federal Judge Hook of questions concerning the amount which the Metropolitan Street Railway is to take from earnings, the interest which the city will have, and the method of acquiring such interest, all present property is valued in the contract at $30,000,000. The earnings of the property are to be available first for operating expenses and second for payment of 6 per cent on the contract value. All the balance is to be applied to the paying down of the capital account until it has been paid off to a point where it represents the actual value of the property. This, it is claimed, will be about $22,000,000.

When the actual value is reached the earnings after deductions for operating expenses and the 6 per cent on the remaining unliquidated capital shall be divided one-third to the company and two-thirds to the city. The citiy's share shall continue to be used to pay off the capital account.

As the capital account is paid down, the 6 per cent return is abated and the city becomes, to an amount represented by paid-off capital, owner of the property. When one-half of the contract value and one-half of the new additional money invested has been paid off, the city becomes absolute owner of the property, subject to existing mortgages for the other half. The city gives up its present revenues from the 8 per cent clause and the loop rentals, amounting to about $170,000 a year. The company is to pay taxes, licenses, special assessments and other public charges on the same basis as other property in the city.

Mayor Jost issued the following statement giving the principal features of the proposed franchise:

"(a) The repeal of 300 or 400 existing ordinances, making the proposed ordinance the sole repository of the company's rights and privileges.

"(b) The organization of a new Missouri corporation to buy and acquire all the Missouri property, free of mortgage or other encumbrances, thereby making the city's contract a first charge against the property with the exception of $2,600,000 of 6 per cent bonds maturing in 1922.

"(c) The organization of a Kansas corporation to acquire all the Kansas property in like manner.

"(d) The lease by the Kansas corporation to the Missouri corporation of all the Kansas property.

"(e) An assumption by the new corporation of the duty to refund the present bonded and mortgage debt and the payment of all lawful obligations, including judgments owing by the present corporations, but all this subject to the city's contract.

"(f) A directorate in the Missouri corporation of eleven persons, the number not to be increased without the consent of the city; three places on the board to be filled by Kansas City, Mo., two by Kansas City, Kan., as long as the Kansas property is operated with the Missouri property as one system; if separated, Kansas places on the board to be filled by Kansas City, Mo. The directors are to be selected by the Kansas City Court of Appeals from a list submitted by the Mayor containing five names for every one director to be selected, the Court of Appeals to have the right to reject the Mayor's list entirely and compel submission of additional lists until satisfied. The company is to issue stock to persons so selected in order to qualify them for such directors and elect them and protect them in their offices and in the exercise of their duties, failing in which the franchise then and there ends and becomes null and void without action on the part of the city. The term provided for the directors is three years, with succession possible.

"(g) The property is to be operated by two persons, one selected by the company, one by the city, with no definite term of employment, the object being to continue good men as long as possible. Either or both may be summarily removed by the Circuit Court for misconduct and neglect of duty. Generally speaking, these two men are to have all the powers usually exercised by a general manager of a street railway. A third member is provided whose only function is to settle disputes between the two where they are unable to agree, and his decision in such matters is final. He is to be agreed upon between the city and the company, or, in case of non-agreement, to be named by the state utilities board. He may be removed at any time by agreement of the parties or at the instance of any person interested, for neglect, fraud or misconduct.

"(h) The motive power is not to be changed except with the consent of the city. The city may require trolley wires to be put in conduits under ground.

"(i) The company is to pave and keep in repair the street between its tracks and 18 in. beyond each outer rail. If it fails to perform this obligation, the city may order such paving or repairs to be done and the cost thereof shall be a lien against the property and bear 8 per cent interest until paid. The company must also bear all expenses of regrading on its portion of the street.

"(j) The term of the franchise is thirty years from the date the ordinance becomes a law. (The present franchise runs until 1925.)

"(k) Certain definite work must be promptly begun and finished within three years. Certain definite work and improvements are required after three years.

"(l) The cars operated for the system must be the equal in style and pattern of the best in the United States. A definite number must be purchased and added to the present supply within a year.

"(m) The city reserves the right to object to any salary which it considers extravagant or to any wage which it considers inadequate and to have the question settled by arbitration.

"(n) The company is not obliged to build extensions in any one year exceeding 4 miles single track or 2 miles double track. The city or any of its inhabitants may build extensions to existing lines or build new lines and connect them with the company's lines, and the company shall be obliged to run cars over such extensions and operate the same as a part of the company's system.

"(o) The city to have the right to use the poles of the company to carry city signals, telegraph, telephone and electric light wires as well as city lamps.

"(p) Other companies desiring to enter the city may use any part of the company's tracks not to exceed six blocks and also the down-town loops, upon paying proper compensation. Interurban cars are to be received at the limits and carried by the company promptly to the heart of the city and returned.

"(q) The company is to sprinkle the streets occupied by any track for its entire width, the city to furnish water. The company is to sweep and keep clean that part occupied by its tracks; to clean off snow and ice street sweepings and remove them entirely from the street instead of shoveling upon that part maintained by the city. The city may require the company to haul garbage cars over its lines at night under direction of the city, on payment of proper compensation.

"(r) Extensions shall not be built unless the representatives of the company and of the city operating the property shall first certify that if built the earnings thereof will equal 6 per cent on the money invested and the expense of operation.

"(s) No part of the earnings shall be used directly or indirectly to increase the capital account. The contract or capital value shall not be increased in any case except where new money is obtained and invested.

"(t) The company shall not sell, mortgage or encumber any of its property without the consent of the city.

"(u) The rate of fare shall be 5 cents per passenger with free universal transfers to all points on the system. The fare shall not be reduced at any time if the effect of such reduction impairs to any extent the 6 per cent return allowed on capital or materially impairs the right of the shareholders to receive one-third of the surplus at the time fixed for such participation according to the earning power of a 5-cent fare, or diminishes the city's share of earnings to such an extent as to defeat paying off one-half of the capital account and consequential city ownership by the time this contract expires.

"(v) The city may purchase at any time all of the property in Missouri or that part within Kansas City, Mo., paying an amount equal to the unliquidated part of that one-half of capital by which it would in the ordinary operation acquire the property, plus the reasonable value of the shareholders' rights of participation, which, if not agreed upon, shall be arbitrated.

"(w) New bonds issued to refund the present maturing ones, as well as mortgages for new money, may be placed against the property for the full term of this contract, and such part as remains unpaid at the expiration of this contract shall continue as a charge against any person, including the city, who comes into possession of the property.

"(x) Forfeiture proceedings may be instituted by the city for a breach of the contract in the Circuit Court. If the Circuit Court decrees a forfeiture, the property shall then and thereafter, and pending appeal and final determination of the litigation, be directed by the three city representatives on the board of directors and two named by the company. The profits which but for the forfeiture would belong to the company shall be impounded and kept to abide the final judgment on appeal. If the judgment of the Circuit Court be reversed, the company shall be restored to the direction and control of the corporation and receive the impounded profits; if, however, the judgment be affirmed on appeal, such affirmance shall have the effect to foreclose forever all rights and privileges of the company in the property and the impounded profits shall belong to the city and be by it used to pay off capital value. The three city directors shall then and thereafter continue in exclusive possession and control of the property as trustees for the city, maintaining and directing it according to the provisions of this ordinance. The forfeiture shall not relieve the city from its obligation to pay off the capital value and 6 per cent interest thereon to the holders thereof pending such payment.

"(y) The ordinance shall not become effective unless and until ratified by the people and accepted by the company, and the company must, at the time of such acceptance, obtain and file with the city a complete surrender and relinquishment by the present companies of all claims against the property or against the city."

In an interview concerning the franchise Mayor Jost spoke as follows:

"The city has no moral right to exact any condition which will take from the owners of the property a single dollar of honest investment; on the other hand, the owners have no right to any contract which will in any degree curtail the power of the city to control and secure to the public the highest grade of service. My view of the matter is that the city and the company should take up this franchise negotiation and reach an agreement that will do justice to both sides."

A difference of opinion that promises to be a stumbling block in the negotiations developed on Aug. 14, when the question of whether the system should be operated under two companies or one, with a single board of control or two, came up. Counsel for the receivers of the Metropolitan Street Railway insisted that the system can be financed to a much greater advantage if operated under one company with a single board of control. Counsel for the city admitted that it might be possible to work out a plan of that kind, but declared in favor of the organization of two corporations, one to control the Kansas lines and one to control the Missouri lines, earnings, operations, maintenance, and repair expenses being apportioned upon an equitable basis. Kansas City, Mo., desires these two corporations to be under one board of control, whereas Kansas City, Kan., insists upon two boards of control.

An important turn in the negotiations came on Aug. 15, when Mayor Jost proposed to the street car representatives to substitute for the board of control (consisting of two members and a standing arbitrator) a single street railway commissioner to be named by the company and the two cities, subject to the approval of the state utilities commissions of Kansas and Missouri. This railway commissioner, the Mayor said, should be named in the franchise when put before the people for a vote. In case the plan for a board of control of three members should be carried out, he was willing that the approval of the city's member should be vested in the Missouri Utilities Commission. The Mayor also proposed to submit the naming of the city's three directors to the approval of the commission.

Further Developments in Detroit

On August 14 John Naylon was agreed upon as the third arbitrator of the wage dispute between the Detroit United Railway and its conductors and motormen, thereby bringing to an end the efforts made during the past three weeks to find among more than fifty names a man satisfactory to both parties. The board of arbitration as now constituted consists of Mr. Naylon, Judge James Phelan for the employees, and Attorney Edward Henderson for the railway company.

At a meeting on Aug. 18 Mr. Henderson, for the compay, and W. D. Mahon, representative of the employees, briefly explained to Mr. Naylon the points he will be required to pass on, and it was stated that four sections of the old agreement between the employees and the company would be arbitrated. The employees desire Section 15, relative to wages, and Section 21, relative to hours, to be changed. The men demand an increase from the present rates, 25, 28 and 30 cents per hour, according to the length of time they have been in the service, and it is reported that they will ask for a flat 35 cents per hour. They also desire a minimum workday of nine hours to be completed in eleven hours.

The company, on the other hand, has demanded abritration on Sections 6 and 19. Section 6 decrees that when mistakes are made by the conductors in figuring fare and time slips the company shall notify them of the mistakes in seven days or be debarred from taking the amount of the mistakes out of the next pay. The company wishes more time to bring up these mistakes, thereby enabling it to cut down clerical expense. Section 19 provides for free transportation to the employee.

W. D. Mahon announced that he had arranged with General Manager Brooks, of the Detroit United Railway, to open up the last paragraph of the present agreement, which provides that the agreement shall not be opened for abritration of disputed points except by consent of both parties.

Regular public hearings before the board of arbitration began Aug. 20. All the evidence that could be presented in documentary form was submitted in that shape. It is intended that new witnesses will be called during the hearings, most of them merely to explain the documentary evidence. It is believed that the presentation of evidence should take about ten days. The company will prepare sections to take the place of those objectionable to the men, and vice versa, and the board of arbitration will work the matter out.

During the delay in the selection of the third arbitrator some criticism was made to the effect that it was caused by Mr. Henderson's refusal to accept men proposed by Judge Phelan. The latter asserts, however, that both men did their best to find an acceptable man and that the objections raised on either side were consistent and well founded. In reply to the statement that all men named by him were closely identified with the railway, Mr. Henderson made public a list of the names he suggested as possible third arbitrators. Among these appear those of Henry Ford, John B. Howarth, T. J. Bosquett, Judson Bradway, Fred Guenther, Dr. J. H. Carstens, John S. Haggerty, Joseph Boyer, C. F. Backus, Edward Telfer, F. J. McDonald, H. J. Lesher, E. S. George, T. V. Dutton, J. C. McGregor, H. L. Jenness, H. L. Pierson, C. E. Baxter, W. S. Duncan and H. M. Leland. Attorney Henderson also stated that the

company had not hampered him in any way in the selection of a man and had offered no advice unless he requested it.

Aug. 9 was the date set for the employees to vote on the strike question. Through the intervention of Mr. Mahon, however, the men decided to delay matters a little longer in the hope of an amicable settlement. On Aug. 13 Mr. Mahon announced that a third arbitrator would have to be selected within three days or the men would walk out.

A question has arisen as to vesting street railway conductors and motormen with police authority under the Lee law, which went into effect on Aug. 15. While street cars are mentioned in connection with railway trains in the law, it will probably be necessary to secure a ruling from the Attorney General concerning the real intent of the law. Police Commissioner Gillispie is reported to have said that if a ruling is issued to the effect that the law gives motormen and conductors police powers, he will carry the matter into the courts. He holds that it is much better for the train crews to carry unruly passengers until policemen can take them from the cars and see that they are prosecuted than to eject them and allow them to escape arrest.

On the evening of Aug. 12 a resolution was introduced in the Common Council placing the supervision of all the extensions to the present street railway system in the hands of the street railway commission. The action was opposed by some of the members on the ground that complete plans should be mapped out for the handling of street railway matters under the new conditions and that no hasty steps should be taken. The measure was sent to the utilities committee, where nothing will be done with it until a decision on the Verdier home rule act has been received from the Supreme Court.

An ordinance giving the Detroit United Railway authority to build an extension on Kercheval Avenue was sent to the same committee to await the completion of the proposed plans and the decision of the court.

In a letter read before the new street railway commission on Aug. 12 J. C. Hutchins, president of the Detroit United Railway, said, in reply to a communication from the commission, that "We shall be very glad to negotiate for the sale of the company's properties within the city of Detroit at any time you may wish to take these matters up." The commission thereupon directed that President Hutchins and other officers of the company be invited to attend its next meeting on Aug. 14. On that date the members of the commission met with President Hutchins and General Manager Frank W. Brooks and the subject was discussed in detail. At the request of the commission the company agreed to submit an inventory of all its property, including real estate, track, cars, machinery and equipment. Engineers employed by the commission and the company's engineers will then go over the list in order to reach a valuation of the property. Franchise values will not be considered in this appraisal, although they were discussed in a general way at the meeting.

President Hutchins said that it would require about ninety days to complete the inventory, but in order to expedite matters it will be submitted to the commission in instalments. The engineers may thus begin their work as soon as the property in any one department is listed, which work will be begun immediately by a large force of clerks.

The Modified Buffalo Agreement

Motormen, conductors, carhouse men, shopmen and other employees of the International Railway, Buffalo, N. Y., have ratified the modified agreement between their representatives and the officers of the company; the agreement, signed by both parties, will continue for three years. The text of the modified agreement will not be given out by the company or by the men, but the principal provisions of the modified agreement follow:

Reduction of the term of contract from five years to three years. Increase in wages for the shopmen from 2 to 4 cents an hour with a minimum wage of 24 cents. Increase in wages for the carhouse men from ½ cent to 2 cents an hour with minimum wage of 24 cents. Highest wage for motormen and conductors to be received on May 1, 1914, instead of May 1, 1916. Early, late and swing runs are to be operated on a basis of eleven hours as maximum and nine hours as a minimum. All runs are to be made as near ten hours' duration as possible. The day's work must be completed in twelve consecutive hours. Extra men and regular men called upon to do duty after their regular hours and to do extra work are to receive pay for at least five hours' work whether they work five hours or not. Regular men cannot be ordered to report for work after completing their regular run but may do so if they wish. Employees on the "owl" cars are to be required to work only eight hours but shall receive ten hours' pay. All engineers, conductors and brakemen on interurban runs are to receive from 2 to 4 cents an hour increase. Snow-plow men are to receive from 35 cents to 40 cents an hour for seventeen hours' work, an increase of 5 cents an hour.

Provision is also made in the new contract that any man brought up on charges for any cause shall have the right to appeal to the official making the charges, then to the superintendent, and finally to the president of the company. All pay checks are hereafter to be cashed at the carhouse in which payment to the men is made. Free transportation is to be provided for all employees without their having to wear cap or uniform. Books of passes are to be provided and each employee is to be allowed four tickets a day.

Boston Elevated Arbitration Proceedings Begun

On Aug. 18 hearings were begun in the State House in Boston before James L. Richards, representing the employees, James H. Vahey, representing the company, and James J. Storrow, the special board of arbitration chosen to adjust the differences between the Boston Elevated Railway and its union employees. Mr. Storrow, who has recovered from the operation that necessitated a previous postponement of the hearings, as noted in the Electric Railway Journal of Aug. 2, 1913, acted as chairman.

With the formal opening of the arbitration proceedings over, the first active move by the board was to make a tour of inspection of all the elevated carhouses, shops and the central power station and to ride on cars and observe the duties of trainmen. The tour was made on the suggestion of John P. Feeney, counsel for the union. Mr. Feeney said he believed the board would do its work much better if it were to see the actual conditions under which the men worked and also that it would eliminate much detail which he otherwise would have to submit through witnesses.

One of the principal matters to be decided upon has to do with an increase in wages. It is claimed by the employees that they have not shared in the general increase in wages throughout the country, but that their wages have remained almost stationary while the cost of living has increased. The company's case in answer to this will probably be presented to the board next week.

The meetings of the board of arbitration are being conducted publicly, and more than 100 employees of the company were present at the opening session. Engaged as counsel for the company are Frederic E. Snow and G. M. G. Nichol. The men are represented by John P. Feeney, Joseph B. Eastman and Fred Fay.

Ohio Public Utilities Commission Appointments

Governor Cox of Ohio has appointed Oliver H. Hughes, of Hillsboro, Judge William L. Dechant, of Middletown, and Edward W. Doty, of Cleveland, as members of the State Public Utilities Commission, which takes the place of the old public service commission under a law passed last winter. Mr. Hughes belongs to the Democratic party and served very satisfactorily on the Public Service Commission for the past several years.

Judge Dechant is also a Democrat. He has been a judge and a banker, with much experience with electric light, railway and gas companies, as well as with steam railways. He spent several years in Wisconsin, where he became familiar with the public utilities law of that State. He succeeds John C. Sullivan, of Hamilton.

Mr. Doty, a Progressive, was recommended by Mayor Baker and the Democratic organization of Cleveland. He has been a member of the Legislature and also of the last constitutional convention. He succeeds Oliver P. Gothlin, of Dayton, who will remain with the commission in charge of a bureau devoted to shippers.

Test for Interurban Rates in Indiana.—Whether electric interurban lines in Indiana may charge more than 2 cents a mile is to be tested in the courts of the State. The Grand Jury of Porter County has recently indicted the officials of the Gary & Interurban Railway for charging 10 cents for a 3-mile ride.

Buffalo Company Applies for Stage Line.—A hearing has been set for Aug. 23 before Commissioner Hodson of the Public Service Commission of the Second District of New York upon the application of Nathan A. Bundy, superintendent Buffalo (N. Y.) Southern Railway, for a certificate of convenience and necessity for the operation of a stage route from the terminus of the Buffalo Southern Railway tracks at East Seneca to East Aurora.

City Rejects Offer of Seattle, Renton & Southern Railway.—The proposal of the management of the Seattle, Renton & Southern Railway, Seattle, Wash., to sell part of the property of the company to the city of Seattle has been disapproved by the City Council upon recommendation of the committees on utilities and finances. The report of the committees in favor of an offer from the city of $1,200,000 for the entire line, however, was adopted.

Street Improvement on Through-Route Lines in Chicago.—Acting Mayor L. E. McGann on Aug. 14 announced plans for the expenditure of the city's wheel-tax funds, amounting to about $130,000 annually, in the maintenance and repair of streets included under the city's proposed through-route transit system, connecting with county and state roads. The city receives into a general fund 15 per cent of the wheel tax collected, the remaining 85 per cent being applied in the wards in which it is collected.

Massachusetts Rapid Transit Committee of 1893 Entertained.—On Aug. 19 and 20 John R. Graham, president of the Bangor Railway & Electric Company, Bangor, Me., entertained at Portland and Augusta the rapid transit committee of the Legislature of Massachusetts of 1893, of which he was a member. The party left Boston on Aug. 19 in a special car by way of Portland to Augusta, its members staying over night there and being entertained by the citizens at a banquet. The appointment of this committee in 1893 was the beginning of the agitation of the rapid transit question in Boston that has resulted in the present subway and elevated railways and tunnel system.

Opening of Bids for Astoria and Corona Line.—Bids were opened on Aug. 19 before the Public Service Commission of the First District of New York for the construction of Section 1 of the Astoria, Woodside & Corona Rapid Transit Railroad. The two lowest bids received were from the Snare & Triest Company, $884,000, and from the Thomas J. Buckley Engineering Company, $894,000. The highest bid, $1,070,000, was made by the Degnon Construction Company. On the same day formal hearings were held on the forms of contracts for five sections of the Lexington Avenue Rapid Transit Railroad and the White Plains Road Rapid Transit Railroad, such hearings being required by law before bids may be called for.

President Shonts Narrowly Escapes Serious Injury.—Theodore P. Shonts, president of the Interborough Rapid Transit Company, New York, N. Y., had a narrow escape from death on Aug. 18, when he fell beneath a moving railway train at Le Breuil, France. A bystander pulled Mr. Shonts from beneath the wheels just in time to save him from being run over. Mr. Shonts' hands and legs were cut, but the injuries were not serious, and after they had been attended to he proceeded to Paris. At the time of the accident Mr. Shonts had alighted for a stroll on the platform at Le Breuil. In endeavoring to return to his compartment he had difficulty in opening the door. He was tugging at the handle when the train started, causing him to lose his balance and fall upon the tracks.

Toronto Valuation Slowly Progressing.—The valuation of the property of the Toronto Railway and Toronto Electric Light Company will probably not be completed before the end of August, for on account of the layout of the city there is no bulking of the work. Very much detail work is obligatory. A staff of ten men, some experts in the use of scientific instruments for measuring and calculations, others experts on clerical work, are working long hours on the valuation. Miles of rails, wires and poles have to be measured, and the numerous intersections have to be diagrammed and valued, for the intersections are all different and were made by hand. On Aug. 13 Controller Church demanded that Mayor Hocken should send to the Board of Control the interim offer for the purchase of the Toronto Railway, but the latter refused to furnish any information until the experts make their report.

Grade Crossing Protection Ordered in Los Angeles.—Adequate protection of the public from the menace of grade crossings on high-speed electric lines and steam railroads was ordered on Aug. 14, by the Board of Public Utilities of Los Angeles, Cal., when President McReynolds announced that safety appliances should forthwith be provided at 108 of the 354 crossings examined by Expert George L. Davenport, Jr. Mr. Davenport reported that 156 crossings in the city of Los Angeles demanded additional safeguards at once, but that 108 crossings were considered "dangerous" and should be protected immediately. Various means of portection were ordered, flagmen, gates, gongs or wigwag signals with gongs, as each case demanded. The Board of Public Utilities started an investigation with a view of launching a campaign for the elimination of all grade crossings within the city limits, but finding that the State Railroad Commission was making an investigation along this same line, the commission concluded that immediate action could best be obtained by ordering the installation of safety appliances. The campaign for the abolition of all grade crossings, however, will be continued.

Tribute to Mr. Stevens.—In an editorial which it published at the time it announced the resignation of R. P. Stevens as president and general manager of the Lehigh Valley Transit Company, Allentown, Pa., one of the local papers said: "In the six years that Mr. Stevens has been with the local transit system epochal changes have been made, due in large measure to the constructive genius of the man. That was what he was brought to this city for and that is what he has accomplished beyond any promises made for him upon his coming or by him during any portion of his administration. Mr. Stevens will leave Allentown with the admiration of the city for the splendid transportation system that he has provided by his genius, and with the regret that at a time when his dreams are coming true he shall not be here to enjoy them. To a large degree his work is done. The large undertakings are about complete. The consolidation of electric railway systems and power systems for greater economy in management and better service has been put into effect. Some other field now needs his services, for every business at some time or other is looking for a builder."

Union Agitation on Indiana Interurban Lines.—An attempt was recently made to organize a union, to be called the "Three Star Organization,'" among the interurban trainmen of the several lines radiating from Indianapolis. A number of trainmen paid the initiation fee of $5.50 but could not obtain information in regard to the nature of the organization, its real name, principal headquarters, officers, etc. In an endeavor to recover the fee, William E. Young, a motorman on the Union Traction Company of Indiana, brought suit for $10 damages on a charge of fraudulent representation. At a preliminary hearing the organizer, Carl S. Black, asserted that the headquarters of the association was in Minneapolis, Minn., that a charter had been issued in Indianapolis about July 15, and that the Three-Star Organization was affiliated with the American Federation of Labor. Owing to a lack of concrete evidence to substantiate his statements, however, it was decided to continue the case for trial September or October. At the present time the managements of the different interurban roads whose trainmen have supposedly become affiliated with this organization anticipate no serious trouble. A new move on the part of the organization of electric railway employees was brought about on July 16, when they voted to become affiliated with the Amalgamated Association of Street and Electric Railway Employees of America. Up to the present time no formal demands have been presented to the companies, but a set of grievances signed by a committee composed principally of ex-employees of the different interurban lines has been presented. This set of grievances does not give recognition to any organization, and there is no indication that any organization is presenting them.

Financial and Corporate

Stock and Money Markets

Aug. 20, 1913.

The opening market in the New York Stock Exchange to-day was moderately active and higher. Through the day it ruled irregular with strength in spots. Advances and declines were but fractional, generally running from ⅛ to ½. Interborough-Metropolitan preferred gained 1¾ on fairly active trading. Rates in the money market to-day were: Call, 2 @ 2¼ per cent; sixty days, 3¼ @ 4 per cent; ninety days, 4½ @ 4¾ per cent; four months, 4¾ @ 5 per cent; five months, 5½ @ 5¾ per cent; six months, 5¼ @ 5½ per cent.

In spite of the fact that the Philadelphia market continued dull and uninteresting, there was a steadier undertone. Philadelphia Company was sold down on small odd lots and Philadelphia Rapid Transit advanced to 22½.

Bonds were steady in Chicago to-day. Stocks were strong, a sale of 3,335 shares of Chicago Railways, Series 2, being noted.

The Boston market was inactive and without any special feature, there being few fluctuations.

Moderate trading was displayed on the Baltimore Exchange to-day. Bonds showed greater activity than stocks.

Quotations of traction and manufacturing securities as compared with last week follow:

	Aug. 13.	Aug. 20.
American Brake Shoe & Foundry (common)	91	91
American Brake Shoe & Foundry (preferred)	131	131
American Cities Company (common)	37⅜	35
American Cities Company (preferred)	66	63½
American Light & Traction Company (common)	350	356
American Light & Traction Company (preferred)	104	104
American Railways Company	38	38¼
Aurora, Elgin & Chicago Railroad (common)	41	40½
Aurora, Elgin & Chicago Railroad (preferred)	82½	82¾
Boston Elevated Railway	91	87
Boston Suburban Electric Companies (common)	7½	7
Boston Suburban Electric Companies (preferred)	56½	55
Boston & Worcester Electric Companies (common)	*8	*8
Boston & Worcester Electric Companies (preferred)	42	42
Brooklyn Rapid Transit Company	89⅝	88⅞
Capital Traction Company, Washington	115½	115
Chicago City Railway	170	*170
Chicago Elevated Railways (common)	25	*25
Chicago Elevated Railways (preferred)	70	*70
Chicago Railways, ptcptg., ctf. 1	92	94
Chicago Railways, ptcptg., ctf. 2	26½	29½
Chicago Railways, ptcptg., ctf. 3	7	7½
Chicago Railways, ptcptg., ctf. 4	3	3
Cincinnati Street Railway	105	102½
Cleveland Railway	103¾	103½
Cleveland, Southwestern & Columbus Ry. (common)	a5½	*5½
Cleveland, Southwestern & Columbus Ry. (preferred)	a30	*30
Columbus Railway & Light Company	18	18
Columbus Railway (common)	69½	69½
Columbus Railway (preferred)	88	88
Denver & Northwestern Railway	104	104
Detroit United Railway	a80	75
General Electric Company	142½	145¼
Georgia Railway & Electric Company (common)	114½	114
Georgia Railway & Electric Company (preferred)	83	84
Interborough Metropolitan Company (common)	16⅜	16⅛
Interborough Metropolitan Company (preferred)	60⅞	61⅞
International Traction Company (common)	30	30
International Traction Company (preferred)	95	95
Kansas City Railway & Light Company (common)	18	18
Kansas City Railway & Light Company (preferred)	37	37
Lake Shore Electric Railway (common)	5	5
Lake Shore Electric Railway (1st preferred)	92	92
Lake Shore Electric Railway (2d preferred)	26	26
Manhattan Railway	130	128
Massachusetts Electric Companies (common)	16½	16
Massachusetts Electric Companies (preferred)	72	71
Milwaukee Electric Railway & Light Co. (preferred)	95	95
Norfolk Railway & Light Company	25	25
North American Company	72	71⅞
Northern Ohio Light & Traction Company (common)	a70	62¾
Northern Ohio Light & Traction Company (preferred)	a100	100
Philadelphia Company, Pittsburgh (common)	43½	42½
Philadelphia Company, Pittsburgh (preferred)	40	40
Philadelphia Rapid Transit Company	23½	22½
Portland Railway, Light & Power Company	55	55
Public Service Corporation	109	109
Third Avenue Railway, New York	36¾	36¾
Toledo Railways & Light Company	a6	*6
Twin City Rapid Transit Co., Minneapolis (common)	104	106⅛
Union Traction Company of Indiana (common)	5	5
Union Traction Company of Indiana (1st preferred)	80	80
Union Traction Company of Indiana (2d preferred)	20	20
United Rys. & Electric Company (Baltimore)	27	27¼
United Rys. Inv. Company (common)	25	23
United Rys. Inv. Company (preferred)	45	44
Virginia Railway & Power Company (common)	52½	52½
Virginia Railway & Power Company (preferred)	90½	90½
Washington Ry. & Electric Company (common)	91	89⅞
Washington Ry. & Electric Company (preferred)	88	86½
West End Street Railway, Boston (common)	71¼	72
West End Street Railway, Boston (preferred)	88	88
Westinghouse Elec. & Mfg. Company	68	71½
Westinghouse Elec. & Mfg. Company (1st preferred)	112	114

*Last sale. a Asked.

ANNUAL REPORTS

United Railways Investment Company

Below is given the statement of income and profit and loss of the United Railways Investment Company, San Francisco, Cal., for the year ended Dec. 31, 1912:

Income:		
Dividends on stocks owned	$1,984,172	
Interest on bonds owned	22,465	
Interest on bonds in sinking fund	7,857	
Interest on loans and accounts receivable	78,440	
Interest on bank balances	238	
Other interest (including collections deferred from prior years)	167,078	
Total		$2,260,250
Expenses and other charges:		
Expenses:		
Salaries	$45,998	
Legal	10,245	
Corporation taxes	5,570	
Transfer agents', registrars' and trustees' fees	3,328	
Fees of trust companies for paying coupons, etc.	1,063	
Tax on bonds held in Pennsylvania	2,500	
Directors' fees and expenses	1,381	
Stationery, printing and postage	840	
Traveling	2,939	
General	5,203	
Total expenses	$79,067	
Other charges:		
Interest on collateral trust sinking fund 5 per cent gold bonds	$907,500	
Interest on 6 per cent convertible gold bonds of 1910	73,740	
Interest on 6 per cent notes of 1908	123,000	
Interest on loans and notes payable	7,063	
Interest on dividend certificates	80,234	
Total other charges	$1,191,537	
Total		$1,270,605
Net income for the year		$989,644
Profit and loss surplus at beginning of year		3,110,230
Profit and loss credits:		
Adjustment of Philadelphia Company dividend for 1911	$121,000	
Discount on bonds purchased for sinking fund	35,666	156,666
Profit and loss surplus, Dec. 31, 1912		$4,256,542

As a source of further information to the stockholders, there was appended to the above report the income statement of the United Railroads of San Francisco, which is as follows:

Gross earnings:		
Passenger		$8,416,175
Advertising		55,500
Total		$8,471,675
Operating expenses and taxes:		
Maintenance of way and structures	$542,460	
Maintenance of equipment	468,981	
Transportation expenses	2,870,360	
General expenses	580,780	
Total operating expenses	$4,462,582	
Ratio to gross earnings, 52.68 per cent.		
Taxes	416,000	
Ratio to gross earnings, 4.9 per cent.		
Total operating expenses and taxes		4,878,582
Ratio to gross earnings, 57.59 per cent.		
Net earnings		$3,593,093
Other income:		
Sinking fund earnings	$242,324	
Interest	26,213	
Rentals	10,239	
Miscellaneous	6,543	
Total		285,322
Gross income		$3,878,415
Current income charges:		
Interest on 5 per cent promissory gold notes	$50,000	
Interest on income notes	73,740	
Interest on equipment notes	19,375	
Interest on bills and accounts payable, etc.	42,607	
Rentals and leases	78,800	
Total		264,522
Net income before bond interest charges		$3,613,893
Bond interest:		
United Railroads' bonds	$1,013,360	
Underlying bonds	793,216	
Total		1,806,577
Net income for the year		$1,807,316
From the above net income the following appropriations were made:		
For renewals, depreciation and contingencies	$183,607	
For bond sinking fund reserve	655,757	
For dividends paid on first preferred stock	350,000	

Mason B. Starring, president, says in part:

"The industrial consumption of natural gas increased materially during the year, and, owing to the average of comparatively mild weather in the Pittsburgh district during the last half of the Philadelphia Company's fiscal year, the domestic consumption of natural gas decreased, the net result being an increase in the gross operating revenue derived from natural gas. A forecast of the company's revenue from the production of oil indicates that such revenue will be double that received from this source during the previous year.

"The recently acquired Duquesne Light Company, of which the Philadelphia Company now owns all the stock, having acquired other Pittsburgh electric properties in addition to those previously owned by the Philadelphia Company, began its unified service on Jan. 1, 1913, and paid its initial dividend of 1¾ per cent to the Philadelphia Company in March. The earnings of the Duquesne Light Company are increasing both in gross and net, and it is confidently expected that it will maintain a 7 per cent dividend rate. The condition of the street railway properties, in which the Philadelphia Company is interested, is improving, and the Pittsburgh Railways has concluded a long time contract with the Duquesne Light Company to furnish the railways company's system an adequate and reliable supply of power, thus relieving it from the burden of financing its growing power requirements.

"In accordance with the consents in writing which the stockholders filed with this company in response to my letter of Dec. 6, 1912, the following stocks owned by your company were sold to the California Railway & Power Company: $5,000,000 of first preferred stock of the United Railroads of San Francisco, $20,000,000 of preferred stock of the United Railroads of San Francisco, $8,801,400 of common stock of the United Railroads of San Francisco, $600,000 of preferred stock of the Coast Valleys Gas & Electric Company.

"Your company received therefor: $5,000,000 of preferred stock of the California Railway & Power Company and $34,160,700 of common stock of the California Railway & Power Company.

"All of the stocks sold to the California Railway & Power Company have been delivered, except 24,285 shares of the first preferred stock of the United Railroads of San Francisco, which have not yet been released from the lien of United Railways Investment Company 6 per cent notes of 1908. All of the outstanding preferred and common stocks of the California Railway & Power Company are owned by United Railways Investment Company and the Railroads & Power Development Company; the ownership of the latter company's stock by the Investment Company remains unchanged.

"The income of this new company for the first quarter of its fiscal year was sufficient to meet the full dividend requirements of its prior preference stock at the rate of 7 per cent per annum; accordingly a dividend of 1¾ per cent on said stock was paid April 1, 1913.

"By the payment in 1912 of $400,000 of the 6 per cent serial notes of 1908, and the further payment on Feb. 15, 1913, of an additional $200,000 of said notes, the amount of these notes outstanding was reduced to $1,700,000, an amount less than 50 per cent of the original issue, thereby removing the restriction 'that until the 50 per cent in amount of such notes first maturing shall have been paid, no dividend upon the stock of the Investment Company shall be declared or paid.' This is one more step toward restoring your company to a dividend basis, but the fact remains, however, that the Investment Company is still obligated to pay semi-annually $200,000 face value of the 6 per cent serial notes of 1908, and is restricted by that provision of the outstanding preferred stock dividend certificates which requires their payment 'prior to the payment of any other cash dividend on the preferred or common stock of the company.' It is hoped, however, that within the next year some satisfactory arrangement can be consummated whereby the 6 per cent serial notes of 1908 may be funded, also that means may be found to eliminate the restriction created by the preferred stock dividend certificates. Much thought and consideration is being given to the formulation of some feasible plan to overcome the foregoing inhibitions, to enable the United Railroads of San Francisco to dispose of $1,229,000 of our 6 per cent convertible gold bonds of 1910, and to so shape itself as to pay dividends on its preferred stock, the consummation of which would enable the Investment Company to pay dividends."

Geary Street Municipal Railway

William Dolge of the supervisors' finance committee of San Francisco, Cal., on Aug. 12 filed a statement showing that the Geary Street Municipal Railway has earned a net profit of $19,363.74 for seven months, from Dec. 28, 1912, to July 31, 1913.

Based upon the income of July, 1913, the financial expert estimates that the net profit for the year ending June 30, 1914, will be $101,051. Charges are included against the city railway for operating expenses, interest on the bonds, and also 18 per cent of the passenger revenue for a depreciation sinking fund.

The income, profit and loss statement for the seven months ended July 31, 1913, is as follows:

Revenues	*$181,760
Actual expenses	92,749
Gross operating profit	$89,011
Deduct depreciation sinking fund, being 18 per cent of passenger revenues	32,679
	$56,332
Deduct interest on bonds	36,968
Net profits, seven months ended July 31, 1913	$19,364

*From Dec. 28, 1912, to June 24, 1913, the road was operated, but only to a partial extent, between Kearny Street and Thirty-third Avenue. Since the last-mentioned date the road has been in full operation from the ferry to the beach.

A similar statement for only the month of July, 1913, shows the following results:

Revenues	$46,836
Actual expenses	19,967
Gross operating profit	$26,869
Deduct depreciation sinking fund, being 18 per cent of passenger revenues	8,420
	$18,449
Deduct interest on $1,969,000 bonds sold	7,383
Net profit, month ended July 31, 1913	$11,066

On the basis of the income, profit and loss statement for July, 1913, the following statement was prepared by Mr. Dolge, showing the estimated income for the year ending June 30, 1914:

Estimated revenues, average $45,900 per month	$550,800
Estimated expenses, average $21,000 per month	252,800
Gross operating profit	$298,800
Deduct depreciation sinking fund, 18 per cent of gross income	109,144
	$189,656
Deduct interest on $1,969,000 bonds sold	88,605
Estimated net profit, year ended June 30, 1914	$101,051

"The following figures," says Mr. Dolge, "show what the net profits of the city road would be were it a privately owned utility, bearing such charges as state and federal taxes, franchise taxes, licenses for cars, attorney's services, insurance and similar items. Under these circumstances the road would show a profit of $52,578 for the year ended June 30, 1914. This statement is also based on the statement of income, profit and loss for July, 1913:

Estimated revenues, average $45,000 per month		$550,800
Estimated operating expenses $21,000 per month	$252,000	
Taxes—state, federal, franchise, license	43,813	
Attorney services, insurance, etc.	4,660	
Total		$300,473
Estimated gross operating profit		$250,327
Deduct depreciation sinking fund, being 18 per cent of passenger revenues		109,144
		$141,183
Deduct interest on $1,969,000 bonds sold		88,605
Net profit, year ended June 30, 1914, after inclusion of all comparison charges		$52,578
Estimated net profit as above		$52,578
Add comparison charges (saved under municipal operation), taxes —state, federal, franchise, etc.		43,813
Attorney's services, insurance, etc.		4,660
Actual net profit year ended June 30, 1914		$101,051

"The gross receipts for the first eleven days of August were $17,712, averaging $1,610 per day. On this basis,

instead of the basis of the July average, the gross receipts for the fiscal year ending June 30, 1914, would be $584,650 instead of $550,800, as above."

It would have been interesting if detailed figures had been submitted in regard to what compose the "expenses" in the above statements, in order that a basis of comparison might be had for determining what are the relative costs of the various operating items under private and municipal ownership of public utilities and whether other differences might be found than those in connection with taxes (state, federal, and franchise), legal fees, insurance, and the like.

Electric Properties Company Accepts Readjustment

At a recent meeting of the stockholders of the Electric Properties Company the plan for reduction and readjustment of the capital stock was approved as formulated by a committee composed of John F. Wallace, Henry R. Hayes and Albert M. Chambers, whose appointment was noted in the Electric Railway Journal of May 17, 1913. The stockholders voted to sell the assets of the Electric Properties Company to a new company, organized under the laws of Virginia, to be known as the Electric Properties Corporation, with an authorized capitalization of $4,000,000 6 per cent cumulative preferred stock and $4,000,000 common stock.

The outstanding capitalization of the new company will consist of the authorized common stock, $3,920,200 of the preferred stock and $411,533 of five-year 6 per cent redeemable notes or bonds. The latter represents all accumulative dividends upon the outstanding preferred stock for the period from Feb. 1, 1910, to April 30, 1912. The dividends upon the preferred stock of the old company, from May 1, 1912, to Sept. 1, 1913, will be paid in cash.

The preferred stock of the old company will be exchanged, par for par, for the preferred stock of the new company. The $6,000,000 of common stock of the old company will be exchanged at the rate of two shares of the new stock for three shares of the old stock.

The officers of the Electric Properties Corporation will be: President, John F. Wallace; vice-president, A. M. Chambers; secretary and treasurer, John Seager. The Electric Properties Corporation will own all the capital stock of Westinghouse, Church, Kerr & Company.

Interstate Railways

The Interstate Railways, Camden, N. J., reports earnings as follows for the fiscal year ended Jan. 31, 1913:

Credits:		
Income from dividends, interest, loans, etc.		$554,968
Debits:		
Interest on Interstate Railways Company collateral trust gold bonds, Feb. 1, 1912, to Feb. 1, 1913	$431,064	
Expenses (including taxes)	4,353	435,417
Surplus for the fiscal year ended Jan. 31, 1913		$119,550
Dividends on preferred stock paid July 1, 1912, and Jan. 1, 1913		60,000
Net surplus for the fiscal year ended Jan. 31, 1913		$59,550

Beaumont (Tex.) Traction Company.—An order signed by Judge Gordon Russell of the United States District Court was filed in the office of United States Deputy Clerk C. C. Bumpass on Aug. 9, 1913, discharging James F. Weed as receiver for the Beaumont Traction Company, authorized in the case of the Interstate Trust & Banking Company against the traction company. For some time Mr. Weed has been managing the affairs of the traction company, but he withdrew when the properties of the company were taken over by Stone & Webster.

Buffalo & Williamsville Electric Railway, Williamsville, N. Y.—Mayor Louis Wiard of Batavia expects to confer with Godfrey Morgan, Buffalo, secretary of the Buffalo & Williamsville Electric Railway, in regard to the status of the company. After the company discontinued its service between Williamsville and Batavia, it was ordered, as recently reported in the Electric Railway Journal, to resume through service between Buffalo and Batavia. When Mr. Morgan was in Batavia recently he was quoted as saying that he had taken the matter up with residents of Batavia and that a new company would be organized to take over the line into Batavia.

Dedham (Mass.) & Franklin Street Railway.—The sale of the Medfield & Medway Street Railway, which, as noted in the Electric Railway Journal of Aug. 16, 1913, is to take place at the office of Hayden, Stone & Company, Boston, on Sept. 15, is to be accompanied by the sale of the Dedham (Mass.) & Franklin Street Railway. These two roads were each held under the receivership of Eugene H. Mather.

Evanston (Ill.) County Traction Company.—The Evanston County Traction Company has recently been incorporated to take over the lines in Evanston formerly owned by the County Traction Company, the sale of which lines to a group of capitalists was noted in the Electric Railway Journal of Aug. 9, 1913. The Evanston City Council has granted a new twenty-year franchise. The city will receive 10 per cent of the gross receipts until the rehabilitation of the old line between Evanston and Chicago, which is expected to take about two years, has been completed. During the following three years no payment will be made to the city, but after that time the city will, it is stated, receive 5 per cent of 75 per cent of the gross receipts.

Highland Park & Lake Burien Railway, Seattle, Wash.—The city utilities committee of the City Council of Seattle has voted to take over the Highland Park & Lake Burien Railway as soon as the owners present a clear title to the property and an unquestioned right-of-way between Spokane Street and Iowa Street, near the West Waterway, to Lake Burien, a distance of about 9 miles, half of that within the city limits.

Louisville & Northern Railway & Lighting Company.—The Louisville & Northern Railway & Lighting Company, which is a subsidiary of the Indianapolis, Columbus & Southern Traction Company, has petitioned the Public Service Commission for authority to continue the present system of accounts rather than adopt a uniform system which has been prescribed by the commission.

Montreal (Que.) Tramways.—The board of directors of the Montreal Tramways has been increased in number from seven to nine, and the two additional places have been filled by J. P. McIntosh, of New York, and W. G. Ross, a former managing director of the Montreal Street Railway.

Nelson Street Railway, Nelson, B. C., Can.—A by-law was recently defeated in which the Council asked authority to guarantee bonds of the Nelson Street Railway to the extent of $40,000 for the purpose of taking care of the company's present indebtedness and providing for additional necessary extensions and rolling stock.

Northern Texas Electric Company, Fort Worth, Tex.—A quarterly dividend of 1¾ per cent has been declared on the common stock of the Northern Texas Electric Company, along with the regular semi-annual distribution of 3 per cent on the preferred stock, both payable Nov. 2, 1913, to holders of record Aug. 20. This dividend compares with dividends of 1½ per cent quarterly from March, 1911, to June, 1913, and of 1¼ per cent from June to December, 1910.

Omaha (Neb.) & Lincoln Railway & Light Company.—The Omaha & Lincoln Railway & Light Company, recently incorporated to take over the Nebraska Traction & Power Company, presumably in the McKinley interests, as noted in the Electric Railway Journal of July 26, 1913, has been authorized by the Nebraska Railroad Commissioners to issue $125,000 of bonds and $75,000 of stock, the latter being equally divided between common and preferred.

Pittsburgh (Pa.) Railways.—The Pittsburgh Railways has filed a twenty-million-dollar mortgage in Allegheny County. It secures that amount of general mortgage 5 per cent bonds, which are to be issued as follows: $4,000,000 to retire an outstanding issue of the Southern Traction Company bonds; $4,500,000 for rehabilitation, betterment and improvement of existing lines of the railway company; $1,450,000 will go to the Philadelphia Company to reimburse it for advances to defray the cost of changes in alteration in the down-town tracks incident to the "hump" removal and other improvements now under way, and $10,000,000 will be expended from time to time for improvements, additions and extensions, not more than 85 per cent of the cost of which is to be paid for out of the bond issue.

Tyler City (Tex.) Light & Railway Company.—A petition has been filed in the Common Pleas Court at Dayton, Ohio, by John H. Schoenberger against John H. Barkman (who was president of the Osborn State Bank), Charles H. Warford and Clem L. Kimmel, officers and directors of the Tyler City Light & Railway Company, to recover $2,500 said to have been paid by the plaintiff for ten first mortgage 6 per cent twenty-year gold bonds of the company. This suit is the development of the failure of the Osborne State Bank. It is charged that the defendants entered into a contract with J. Russell & Company, a former Dayton brokerage house, whereby they became the fiscal agents of the company. The plaintiff claims that he was induced to purchase the bonds by alluring literature and the claim that the company possessed a fifty-year franchise for an electric railway at Tyler. It is alleged that the Tyler City company has defaulted in the payment of interest on the bonds and that they are worthless through failure of the company to comply with the terms of its franchise.

Dividends Declared

Cities Service Company, New York, N. Y., monthly, one-half of 1 per cent preferred and five-twelfths of 1 per cent common.

Columbus (Ohio) Railway, quarterly, 1¼ per cent common.

Northern Texas Electric Company, quarterly, 1¾ per cent common and 3 per cent preferred.

Terre Haute Traction & Light Company, 3 per cent preferred.

Utilities Improvement Company, New York, N. Y., monthly, one-half of 1 per cent preferred and one-sixth of 1 per cent common.

ELECTRIC RAILWAY MONTHLY EARNINGS

BANGOR RAILWAY & ELECTRIC COMPANY

Period				Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1 mo.	June	'13		$60,780	*$28,913	$31,867	$17,198	$14,669
1 "	"	'12		61,590	*28,333	33,257	16,558	16,699
12 "	"	'13		735,690	*334,820	400,870	204,868	196,002
12 "	"	'12		655,622	*298,170	357,452	178,467	178,985

CHATTANOOGA RAILWAY & LIGHT COMPANY, CHATTANOOGA, TENN.

1 mo.	June	'13		$101,635	*$60,466	$41,169	$23,204	$17,965
1 "	"	'12		89,470	*54,892	34,578	22,146	12,432
12 "	"	'13		1,161,121	*694,249	466,872	281,103	185,769
12 "	"	'12		996,075	*592,239	403,836	251,497	152,339

CUMBERLAND COUNTY POWER & LIGHT COMPANY, PORTLAND, MAINE

1 mo.	June	'13		$200,339	*$108,044	$92,295	$57,979	$34,316
1 "	"	'12		186,160	*106,067	80,093	52,894	27,199
12 "	"	'13		2,213,749	*1,225,551	988,198	675,299	312,899
12 "	"	'12		2,079,437	*1,246,664	832,773	606,635	226,138

GRAND RAPIDS (MICH.) RAILWAY

1 mo.	June	'13		$111,514	*$64,325	$47,189	$15,308	$31,881
1 "	"	'12		107,237	*59,256	47,981	14,557	33,424
12 "	"	'13		1,263,822	*732,658	531,164	177,441	353,723
12 "	"	'12		1,207,910	*672,137	535,773	176,735	359,038

LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY, LEWISTON, MAINE

1 mo.	June	'13		$64,292	*$38,019	$26,273	$15,693	$10,580
1 "	"	'12		59,237	*32,085	27,152	14,446	12,706
12 "	"	'13		651,671	*401,233	250,438	175,800	74,638
12 "	"	'12		609,367	*382,660	226,707	173,379	53,328

ST. JOSEPH RAILWAY, LIGHT, HEAT & POWER COMPANY, ST. JOSEPH, MO.

1 mo.	June	'13		$100,513	*$58,763	$41,750	$20,198	$21,552
1 "	"	'12		93,923	*56,401	37,522	19,710	17,812
12 "	"	'13		1,216,616	*686,158	530,458	238,712	291,746
12 "	"	'12		1,136,118	*686,619	449,499	234,139	215,360

NASHVILLE RAILWAY & LIGHT COMPANY, NASHVILLE, TENN.

1 mo.	June	'13		$179,176	*$109,239	$69,937	$38,501	$31,436
1 "	"	'12		167,167	*96,500	70,667	36,994	33,673
12 "	"	'13		2,142,067	*1,238,475	903,592	447,709	455,883
12 "	"	'12		2,016,204	*1,158,339	837,865	416,322	441,543

PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.

1 mo.	June	'13		$568,875	*$291,684	$277,191	$171,538	$105,653
1 "	"	'12		582,964	*277,682	305,282	171,538	105,653
12 "	"	'13		6,683,215	*3,310,139	3,373,076	1,851,786	1,521,290
12 "	"	'12		6,474,508	*3,213,098	3,261,410	1,638,632	1,622,778

*Includes taxes.

Traffic and Transportation

Terms of Insurance for Third Avenue Railway Employees

In the report of the Third Avenue Railway, New York, N. Y., for the six months ended June 30, 1913, which was abstracted in the ELECTRIC RAILWAY JOURNAL of July 19, 1913, page 116, brief reference was made to the arrangement entered into by the company through F. W. Whitridge, president, with the Travelers' Insurance Company for the issue of a policy of $1,000 on each employee of the company. Mr. Whitridge has since addressed a circular in part as follows to the employees:

"The company has made an arrangement with the Travelers' Insurance Company, Hartford, Conn., by the terms of which every employee of the Third Avenue Railway and its affiliated companies can secure a life insurance policy of $1,000 at a cost lower than such policy can be obtained by any individual, and all of the employees to whom this letter is addressed are hereby invited to take out such policy. The terms of the arrangement cover the following points:

"First: The policy will be issued without any medical examination to employees of the company, provided nearly all of them take the insurance.

"Second: This policy is in lieu of the death benefit of $250 under the present rules of the Third Avenue Benefit Association. If any member of the association does not wish to take out the policy, of course his present death benefit of $250 stands.

"Third: This being true, it is convenient and right that the cost of the insurance should be averaged so that each man will pay the same amount, and that a part of such amount should be paid by the association.

"Fourth: The amount payable each year, when the cost is so averaged, will be about $11 for each employee who is a member of the association. The amount to be contributed by the association depends upon the number of members who choose to take out the $1,000 policy. If all of the members of the association take out this policy, the association can afford to pay, for each of its members, $4 of this $11, and the insured will have to contribute only the sum of $7 per year in addition to his present dues to the association.

"Fifth: This sum of $7 per year will be paid through the company, and an order upon the company must be signed giving it authority to deduct such amount in weekly instalments of about 15 cents from the wages of the men.

"Sixth: If employees, other than members of the association, desire to take out the policy, the cost will be $12 a year, and a similar order must be given for the deduction of that amount in weekly instalments from the wages of the men.

"Seventh: This policy will remain good on these terms as long as the holder is in the employment of the company.

"Eighth: If anyone having such policy leaves the employ of the company he may continue his insurance upon paying the Travelers' Insurance Company's published rate for his age.

"Ninth: In addition to this $1,000 policy, any employee of the company may, upon the payment of an additional 75 cents per year, obtain an accident policy which will provide for the following:

Loss by severance, both hands or both feet	$1,000
Loss by severance, one hand and one foot	1,000
Loss by severance, one hand or one foot and loss of sight of one eye	1,000
Loss of two eyes	1,000
Loss by severance, one hand or one foot	500
Loss one eye	500
Loss of thumb and index finger of either hand	250

"The three benefits last mentioned will be increased in the amount of $500 in case total and permanent disability for life results from these injuries. This accident policy may also be continued by the insured in case he leaves the employ of the company, but in that case the annual rate will be $1.25.

"Tenth: The benefits of this accident policy are, of course, in addition to (a) any rights which the men have under the above life policy, (b) any sick pay they shall be entitled to receive from the association, and (c) any

rights to recover damages which they have under the law.

"Eleventh: It is desirable that as large a number of the men as possible should accept this insurance scheme, as the Travelers' Insurance Company makes it a condition, in waiving the medical examination, that substantially all the employees should take the policy. As there is a good deal of detail to be considered in connection with the matter, this offer will remain open until Nov. 1, at which time we must know how many men take the policies."

The form of the policy which will be issued to each of the men who take out the life and accident insurance was attached to the latter. The policy so attached contained a full statement of the conditions upon which the insurance might be continued after the insured leaves the company.

Order in Regard to Smoking

The order in regard to smoking on cars adopted by the Public Service Commission of the First District of New York (Greater New York) on Aug. 1, 1913, which was noted in the Electric Railway Journal of Aug. 16, 1913, follows in full:

"A hearing having been duly had by and before the commission on June 18, 1913, and the commission being of the opinion after said hearing that the following regulations with respect to smoking and the carrying of lighted cigars, cigarettes and pipes in and upon the cars, stations, station platforms, station stairways, waiting rooms, waiting cars and shelters of the street railroads subject to the jurisdiction of this commission should be put in force, observed and enforced by the corporations operating such street railroads, now therefore it is ordered,

"(1) That all street railroad corporations operating street railroads subject to the jurisdiction of this commission be and they hereby are directed and required to prohibit smoking or the carrying of lighted cigars, cigarettes and pipes in or upon their stations, station platforms, station stairways, waiting rooms, waiting cars or shelters; also to prohibit such practices in or upon the cars or the platforms of the cars operated by them, of whatsoever type such cars may be; except that upon the open cars having running boards along the sides and having seats accessible directly from such running boards smoking and the carrying of lighted cigars, cigarettes and pipes may be permitted on not more than the four rear seats of each car, including the seat on the back platform thereof. Said corporations are also directed and required to make and enforce regulations prohibiting the practices mentioned, except as herein permitted; also to post conspicuously in their cars, stations, waiting rooms, waiting cars and shelters appropriate notices that such practices are prohibited therein, except as herein permitted; also to instruct and direct their employees to see that such regulations are enforced.

"(2) That this order shall take effect immediately and shall continue in force until changed or abrogated by further order of the commission.

"(3) That each of the street railroad corporations upon which this order is served notify the commission within ten days after service of this order upon it whether the terms of this order are accepted and will be obeyed."

President Shoup on Fares on the Pacific Electric Railway

In a statement in regard to fares over the Pacific Electric Railway between Los Angeles, Cal., and the beach cities, Paul Shoup, president of the company, recently made the following statement:

"All tickets, including commutation tickets, absolutely essential to the prosperity of the beach cities being counted, the earnngs per passenger between Los Angeles and the Santa Monica Bay cities are very little in excess of 1 cent per mile.

"No comparison with street-car fare is just because the blanket rate of 5 cents on street cars applies not only for 5 miles, but also for rides of one block, while there is no commutation rate. This blanket rate of 5 cents makes average earnings per passenger per mile in any city in the United States the size of Los Angeles greater than that between Los Angeles and the beaches by the Pacific Electric Railway.

"The Pacific Electric Railway runs during the summer season special excursions nearly every week at a 25-cent rate for the round trip to care for people who feel they cannot afford the higher rate. On a round trip to Long Beach, 42 miles, this yields hardly ½ cent a mile, or to Santa Monica about ⅔ cent a mile. The company cannot make any such mileage rate generally and continue to operate.

"The expense to the company for every item since the road was built to the beaches has increased greatly. It has raised the wages of interurban trainmen twice in four years. The interurban cars now in use cost 50 per cent more than those of five years ago, while the new steel cars will be almost double the cost of the old. This increased expenditure may be found throughout every department of the company.

"The public demand for improved and additional facilities and for safety has made it necessary for the company to add to the cost of its existing lines, not including extensions, at the rate of some $2,000,000 a year.

"Present rates are not extortionate even for the individual trip. The 50-cent round-trip rate means a fare running from 1 cent a mile to 1.4 cents a mile, while the railway fares in the United States generally range from 2 cents as a minimum up.

"On many of the electric roads on the coast and likewise on all the steam roads the mileage rate is 2 cents and sometimes more. The steam roads of Iowa, Minnesota and Missouri are claiming that the 2 cent rate is confiscatory. The Minneapolis & St. Louis Railroad has proved its case before the United States Supreme Court.

"It must not be forgotten that the Pacific Electric Railway makes low rates for thirty-ride tickets for the benefit of families so that no hardship is worked upon those who do not travel every day, but do travel frequently."

Transfer Zone Extended in Providence.—The Rhode Island Company, Providence, R. I., has received permission from the Public Utilities Commission to extend the transfer zone in East Providence. The transfers can be used within the district bounded by Market Square and Pawtucket Avenue.

Plan to Expedite Car Loading.—The Board of Supervisors of San Francisco plans to expedite street car traffic on lower Market Street by compelling passengers who enter cars at the ferry depot to purchase tickets before boarding the cars. It is hoped thus to obviate the delay caused by conductors of the cars making change.

Indiana Company Asks Increase in Passenger Rates.—The Interstate Public Service Company, Indianapolis, Ind., which controls by lease the Indianapolis, Columbus & Southern Traction Company, Columbus, Ind., has petitioned the Public Service Commission for permission to increase its passenger rates between Indianapolis and Columbus and intermediate points to the maximum, under the law, of 2 cents a mile.

Reduced Rates on New Missouri Line.—J. R. Harrigan, general manager of the Kansas City, Clay County & St. Joseph Railway, Kansas City, Mo., has announced a voluntary reduction of rates from 2½ to 2 cents a mile. The rate from Kansas City to St. Joseph will be reduced from $1.25 to $1.05. The rate from Kansas City to Excelsior Springs will be changed from 65 cents to 55 cents. Rates to other towns on the line will be reduced in proportion.

Reduced Rates for School Children in Troy, N. Y.—The United Traction Company, Albany, N. Y., has announced that reduced rates on its cars in Troy for school children will become effective when the school term opens in September. The rates, to be announced later, will be practically half of the present rates. They will be operative only on school days and during school hours. The system under which the school children will be able to purchase the commutation tickets will also be announced later.

Progress of Re-routing in Philadelphia.—The Philadelphia (Pa.) Rapid Transit Company has issued its Co-operative Bulletin No. 22, including steps Nos. 4 and 5, describing its re-routing plans to take effect during August. The principal object of its re-routing system, it is explained, is to alternate the direction of traffic on parallel streets so as to overcome inconvenience where two adjacent streets

are used for traffic bound in the same direction, and the streets available for travel in the opposite direction are several squares apart.

Complaint Against International Railway Satisfied.—A complaint was recently made to the Public Service Commission of the First District of New York by the Cazenovia Business Men's Association and others against the International Railway, Buffalo, N. Y., regarding passenger cars and service rendered the public on the Abbott-South Park line. A letter has been received by the commission from the complainant, however, to the effect that lately the service has been improved to such an extent as to meet with the association's entire approval.

Ohio Company to Prosecute Conductors Detected Stealing.—So much trouble with certain conductors has lately been encountered by the Northern Ohio Traction & Light Company, Akron, Ohio, because of a tendency to hold out money collected for fares that it has been decided to prosecute all who are detected in the crime. The usual custom has been to dismiss such men from the service, but the officers of the company feel that they only repeat the offense on some other road, and that for the sake of general security prosecution is a better step.

Accident Pamphlet at Atlantic City.—The Atlantic City & Shore Railroad has recently distributed to its employees in all departments a booklet entitled "Accidents: How to Prevent Them," written by David Gibson. The book is of pocket size with twelve pages and graphically describes ways to prevent accidents and the irreparable loss and injury which an accident causes to a sufferer or his family, or both. Later the company may distribute these pamphlets among the public in order to let them know the efforts the company is making to obtain better care on the part of the trainmen.

British Columbia Electric Railway Folder.—The British Columbia Electric Railway, Vancouver, B. C., has issued a traffic folder, "Tips for Tourists," in which is contained various information of value to visitors in Vancouver. The folder is on white paper, printed in black with red captions and special notes, and in the center there is a double-page plan of the company's lines in Vancouver and the suburbs, together with a table showing the distinguishing works of the principal lines. A bird's-eye view of Stanley Park is also given, as well as numerous half-tone engravings made from photographs showing various places of interest around the city and various resorts for amusement and recreation.

Street Car Exhibit at Pittsburgh Exposition.—An elaborate display of street railway cars and equipment is to be made at the Pittsburgh Exposition this year by the Pittsburgh Railways. It is promised that the show will be one that will be appreciated by even the smallest schoolchild, as it will show the evolution of the street railway from a forgotten period to the present time. The exhibition is to be a most pretentious one and will take up a large space in Machinery Hall. A feature will be moving pictures that will give comparisons of street-car service in Pittsburgh and other cities. Actual scenes of the handling of crowds during the rush hours are to be shown. There will also be pictures of accidents and their causes, how people should get on and off cars, and the like.

Free Rides Ended on St. Louis Municipal Line.—After carrying passengers free for ten years, the city of St. Louis has decided to charge fares on the Water Works Railways, an 8-mile line extending from Baden to the Chain of Rocks or the municipal water works. Tickets will be sold at the rate of eight for 25 cents, and 5 cents will be charged for a single ride. City employees engaged in work at the water works will receive free transportation. In the fiscal year ended March 31, 1913, the passengers carried totaled 352,489, including city employees. The last annual report of the water commissioner shows that the cost per passenger is slightly in excess of 3 cents. It is believed that the plan will result in a revenue to the city of from $500 to $600 per month during a considerable portion of the year.

Decision Concerning Interurban Service from Akron.—According to a decision handed down by the Public Service Commission of Ohio, Aug. 5, 1913, the Northern Ohio Traction & Light Company, Akron, Ohio, will be permitted to operate trains of two or more interurban cars on the portions of its lines composing its interurban railway system and so much of its lines in any municipality as is necessary to be used in the transportation of interurban cars in interurban railway service, in charge of one motorman for each train of two or more cars and one conductor for each car in such a train. This permission is based upon the provision that each of such cars when so operated in trains of two or more cars must be equipped with automatic air brakes and must be under the control of the one motorman.

Relief from Reduced Rates Prayed For.—At a hearing before Federal Judge Neterer on Aug. 12, counsel for the Puget Sound Electric Railway declared that the reduction in rates on the company's interurban line between Seattle and Tacoma, made effective by the State Railway Commission three years ago and since sustained by the Public Service Commission, has brought the profits of the railway so low that property valued at more than $4,000,000 does not yield a return of 2 per cent. Counsel for the State asserted that the Superior and Supreme Courts of the State, had found the new rates to be reasonable and lawful, and they opposed the action of the interurban company in seeking to get a permanent injunction in the federal court. Judge Neterer announced that his decision would be held under advisement until the papers in the case and authorities had been examined.

Repeal of Speed Ordinance in Cleveland.—In their effort to secure a readjustment of schedules under the city's plan of operation, the street railway men of Cleveland, Ohio, discovered recently that the old speed ordinance, limiting the speed of cars in the down-town business district to 10 miles an hour and in the residence district to 15 miles an hour, had been repealed shortly after Peter Witt was appointed street railway commissioner. Now there is no limit to the speed the cars may make in any part of the city. According to Commissioner Witt the ordinance was repealed because claimants in accident suits always alleged that cars were exceeding their speed limit and too much opportunity for fraud was thus offered. As a result of the repeal, the street railway employees will not be able to secure extensions in the running time of cars by means of the ordinance, as they expected.

Accident on Wisconsin Line.—Two passengers were killed and more than fifteen others were injured in a rear-end collision on the Milwaukee Northern Railway on the evening of Aug. 10. The following statement is attributed to George Lewis, claim agent of the company: "The accident was unavoidable, caused by a combination of circumstances. Motorman Williams has been with the company for many years and is one of the most reliable men in our employ. He apparently misjudged the distance to the local car. He also says he expected the car to move. He applied the brakes, but did not put them on full force until only a short distance from the other car, when he saw that an accident was unavoidable. He says the brakes worked well, but that the momentum was too great to stop. I believe that had the local car been of heavy construction like the interurban there would have been no fatalities."

Plans for Handling State Fair Crowds in Des Moines.—Plans are being made by the Des Moines (Ia.) City Railway for handling the increased traffic during the coming state fair. Several changes will be made in the routing of cars through the down-town district to accommodate the fair grounds traffic. Only a few of the lines will maintain their present routes and the running schedules will be shortened. There will be sixteen trains and twenty single cars in continuous operation to the fair grounds, in addition to ten cars to be operated continually to the White City, making a total of from sixty-two to sixty-five cars. More cars will be held in reserve for use if needed. For the benefit of the employees on the fair grounds lines, the company has arranged for the erection of a big dining tent at East Thirtieth and Walnut Streets. Dinner and supper will be furnished by the company to the employees free of charge.

Record Excursion on Aurora, Elgin & Chicago Railway.—The Aurora, Elgin & Chicago Railroad, Wheaton, Ill., has experienced some record-breaking picnic parties this year. On a recent occasion "The Fair," a large Chicago department store, held its annual picnic at Glenwood Park, 40 miles out of Chicago. In order to handle this round-trip excursion, it required sixty-eight cars, operated in four,

five and six car trains, leaving the Chicago terminal every half-hour from 8.15 a. m. until 12 m., the return trip being made from 4.15 p. m. until 8 p. m. It is estimated that approximately 4000 people were handled at a chartered-car rate. On another recent date this company handled two excursion parties, one including approximately 2500 people, requiring forty special cars, and the other requiring twenty-two special cars. One party made the round trip to the Fox River Park, near Aurora, Ill., and the other to Glenwood Park, near Wheaton, Ill.

Third Arbitrator Chosen for Investigation at Springfield, Mass.—Henry V. Cunningham, an attorney of Boston, Mass., has been selected as third arbitrator in the investigation of working conditions to be conducted upon the Springfield Street Railway and the Worcester (Mass.) Consolidated Street Railway. The companies will be represented by Bentley W. Warren, Boston, and the employees by William P. Hayes, Springfield. The board will consider the relation of the "nine-hours-in-eleven" law to the working agreement between the companies and their employees. Messrs. Warren and Hayes agreed upon the third arbitrator after about ten days' consideration. Mr. Cunningham is well known in Massachusetts public life, and has been connected with the ballot law commission for about twenty years. He is personal counsel for Cardinal O'Connell and has served upon arbitration boards prior to the present association. The board will meet at once to arrange for hearings.

President Hanchett Entertains Employees at Home.—Benjamin S. Hanchett, president of the Grand Rapids (Mich.) Street Railway on Aug. 12 entertained the employees of this company at his home in Lakewood on the occasion of their eleventh annual outing. The festivities were started early in the afternoon by a concert given by a band composed of employees. This was followed by a baseball game, a series of races and contests, for which prizes were given, a vaudeville performance and a display of daylight fireworks. Aviator Jannus also made a short exhibition flight in his hydro-aeroplane. A generous barbecue supper was informally provided for the picnickers, after which elaborate night fireworks were set off. The final feature of the day was a dance held in the new ballroom of the Hanchett residence, with music furnished by a Filipino orchestra. Louis J. De Lamarter, secretary of the street railway company, assisted by a well-organized staff, was responsible for the excellent management of the picnic. The following day the night men of the street railway company and their families enjoyed the same program, while the day men double-headed their work.

Air Brakes Ordered on Freight Cars in Connecticut.—The Public Utilities Commission has issued an order to the street railway companies of Connecticut restricting their operating freight cars in trains of two or more cars, exclusive of the motor car, on and after Jan. 1, 1914, without having all of the cars making up such train equipped with an air-brake system which can be operated from the motor car, and which will automatically apply the brakes should any part of the train become detached or should a break occur in the pipe line. There are excepted from the provisions of this order, however, emergency cases, such as hauling disabled cars, taking cars to the repair or paint shop, and in the use of cars for the removal of snow from the streets over which the company operates. In the case of cars used in the removal of snow, all such cars when used in trains of three or more, exclusive of the motor car, shall be equipped with automatic air brakes. The fact was brought out in a hearing before the commission on June 18, 1913, that the Connecticut Company has an order or rule in force whereby all stone cars and trailers, or other cars used in freight work, when operated in trains of two or more cars, shall be equipped with chains, the same to be kept hooked up when the cars are in service, as a safeguard in case the couplings should fail; also that all motor cars shall be equipped with hooks or rings to permit the use of the chains between the motor car or cars and trailers to supplement the couplers. In all cases where automatic air brakes are not used, under the exceptions to this order, the commission recommends that the several companies coming coming under the purview of the order adopt the rule of the Connecticut Company.

Personal Mention

Mr. C. S. Mitchell, who has been auditor of the Beaver Valley Traction Company, New Brighton, Pa., has had his title changed to comptroller.

Mr. H. W. Cameron, who was secretary and treasurer of the Pittsburgh, Harmony, Butler & New Castle Railway, Pittsburgh, Pa., has been appointed auditor of the company.

Mr. R. C. Jones, who has been treasurer and assistant general manager of the San Antonio (Tex.) Traction Company, has been elected secretary and treasurer of the company. He succeeds Mr. O. O. Woodman as secretary.

Mr. S. H. Waddell, who has been claim and purchasing agent of the Pittsburgh, Harmony, Butler & New Castle Railway, Pittsburgh, Pa., has been appointed secretary and treasurer of the company in addition to purchasing agent.

Mr. J. W. Adams has resigned as superintendent of transportation of the Pine Bluff (Ark.) Company and has been succeeded in that position by Mr. W. Woodruff, formerly car receiver for the company, who in turn has been succeeded by Mr. Earl Smith, former construction timekeeper.

Mr. R. P. Stevens, who has just resigned as president and general manager of the Lehigh Valley Transit Company, Allentown, Pa., has been elected president of the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, and of its subsidiary companies, the appointment to take effect Oct. 1. An illustrated biography of Mr. Stevens was printed in the Electric Railway Journal of Aug. 16, 1913.

Mr. William H. Hitchcock, who has been general superintendent of the Trenton & Mercer County Traction Corporation, Trenton, N. J., since January, 1913, has been appointed general manager of the company. Mr. Hitchcock began his railway career as a conductor with the Metropolitan Street Railway, Washington, D. C., in 1896. He was promoted to station clerk in 1900 when a number of the smaller properties in Washington were consolidated as the Washington Traction & Electric Company. The latter company was later absorbed by the Washington Railway & Electric Company. Mr. Hitchock was subsequently promoted and served as street inspector, general instructor and division superintendent. He resigned from the Washington Railway & Electric Company in the early part of 1910 to become superintendent of transportation with the Wilmington & Philadelphia Traction Company and the Southern Pennsylvania Traction Company, Wilmington, Del., and continued with these companies until his appointment as general superintendent of the Trenton & Mercer County Traction Corporation in January, 1913.

William H. Hitchcock

Mr. W. G. Ross was elected a director at the recent annual meeting of the Montreal (Que.) Tramways. Mr. Ross was formerly managing director of this company, but resigned in 1910 to devote his attention to his other interests. At this time he is president of the Amalgamated Asbestos Corporation, Ltd., and also chairman of the harbor commission of Montreal, which has charge of improvements to cost several million dollars.

Mr. George W. Manning has been appointed superintendent of railway service of the Utah Light & Railway Company, Salt Lake City, Utah. Mr. Manning has been in the employ of the Utah Light & Railway Company and its predecessors continuously since 1891. He began his service in Salt Lake City as motorman and later was promoted to be timekeeper, starter and inspector. Mr. Manning was appointed assistant superintendent of railway service of the company in 1907.

Mr. Hoyt Catlin has been appointed general manager of the Waycross Street & Suburban Railway, Waycross, Ga. For five years Mr. Catlin has been conducting a series of special experiments in the art of paper making and the distillation of wood and other vegetable matter. While pursuing this work he was superintendent of the Universal Distillation Company, Waycross. In addition to the above-mentioned pursuits, he has been for over three years, with the exception of some eleven months, assistant to the superintendent of the Ware County Light & Power Company, Waycross. Previous experience in central-station, substation and new-business work was gained by Mr. Catlin with the Northern Connecticut Light & Power Company, Windsor Locks, Conn.

Mr. W. E. Terry has been appointed general auditor, assistant secretary and assistant treasurer and purchasing agent of the Appalachian Power Company, Bluefield, W. Va. Mr. Terry entered railway service in 1902 as voucher clerk for the Birmingham (Ala.) Railway, Light & Power Company and remained with that company until 1905, when he resigned to become secretary and treasurer of the Meridian Light & Railway Company, Meridian, Miss. In 1907 he left Meridian to become associated with Stone & Webster as assistant treasurer. Mr. Terry was connected with that organization until 1910, having charge of the Savannah (Ga.) office during 1907. Later he was transferred to the Key West Electric Company, also a Stone & Webster property. In 1910 Mr. Terry went into business for himself as a public accountant, and in February, 1912, he entered the service of H. M. Byllesby & Company. He was with the Consumers' Power Company, Mankato, Minn., and later in Stillwater, Minn., before his appointment with the Appalachian Power Company.

Mr. H. J. Crowley, general manager of the American Railways, Philadelphia, Pa., and vice-president of the Lynchburg Traction & Light Company, Lynchburg, Va., has been elected president of the latter company to succeed Mr. R. D. Apperson, who continues as chairman of the board of directors of the company and of the Roanoke Railway & Electric Company, Roanoke, Va., and the Roanoke Traction & Light Company, Roanoke, Va. Mr. Crowley was born in Unionville, Conn. After completing a four years' apprenticeship with the Pratt & Whitney Company, Hartford, Conn., he entered the locomotive shops of the New York, New Haven & Hartford Railroad. His first electrical experience was with the Schuyler Electric Light Company, constructing electric light plants in New England, Pennsylvania and Ohio. In 1888 he entered the employ of the Thomson-Houston Electric Company and was associated with the late Charles T. Van Depoele in early electric railway developments. Later he was appointed chief of experts of the Thomson-Houston Company. From 1890 to 1893 he was railway manager of the company's Southern office, with headquarters at Atlanta. During this period he was in charge of a number of early railway installations, including Atlanta, Augusta, Savannah, Birmingham, Mobile, Chattanooga and Memphis. From 1893 to 1899 he was manager of the General Electric Company's railway department in Philadelphia. When the American Railways Company was organized in 1899 Mr. Crowley was appointed general manager. This company owns and operates the Scranton Railway and the Altoona & Logan Valley Electric Railway of Pennsylvania, the Bridgeton & Millville Traction Company and the Bridgeton Electric Company, Bridgeton, N. J., the electric railway, electric lighting and gas companies of Lynchburg, Va., the electric railway and electric lighting plants at Roanoke, Va., the electric railway and electric lighting plants in Huntington, W. Va., Ashland, Ky., and Ironton, Ohio, the People's Railway, Dayton, Ohio, the Springfield (Ohio) Railway and the Chicago & Joliet Electric Company, Joliet, Ill.

H. J. Crowley

Mr. Norman McD. Crawford has resigned as president of the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, and its subsidiary companies to devote his time to other enterprises in which he is interested. Mr. Crawford was for several years vice-president of the Ohio Electric Railway, Cincinnati, Ohio, and previously, for a long time, was general manager of the Hartford (Conn.) Street Railway. As a contractor he built the Glastonbury line of the Hartford Street Railway in 1891 and was afterward retained by the company as engineer. In 1894 he was made general manager of the company, which position he held until the Hartford Street Railway was taken over by the Connecticut Company, acting for the New York, New Haven & Hartford Railroad. In December, 1908, Mr. Crawford was elected president of the Mahoning & Shenango Railway & Light Company. Mr. Crawford spent six months in Europe in 1906, investigating street railway conditions there for the committee on public ownership and operation of the National Civic Federation.

Mr. R. D. Apperson has resigned as president of the Lynchburg Traction & Light Company, Lynchburg, Va., but continues as chairman of the board of directors of the company and of the Roancke Railway & Electric Company, Roanoke, Va., and the Roanoke Traction & Light Company, Roanoke, Va. Mr. Apperson was born in 1863. He entered the office of the Pullman Palace Car Company in 1875. In 1886 he became connected with the Little Rock & Citizens' Street Railway, Little Rock, Ark., remaining with that company until 1890, when the property was sold. He then went to Staunton, Va., and in five months an electric railway was built in the interest of his New York and Arkansas associates, who insisted on Mr. Apperson assuming the management of the property. While thus engaged he carried on a contracting business and later built and operated an electric light and gas plant in Staunton for the same interests. In 1899 Mr. Apperson and his associates purchased the property of the Petersburg Gas & Light Company, Petersburg, Va., and the Lynchburg Gas Company. Two years later they purchased the property of the Lynchburg Electric Railway & Light Company and the Lynchburg & Riverton Street Railway, and these properties and that of the gas company were consolidated as the Lynchburg Traction & Light Company. In 1903 the Apperson interests purchased the property of the Roanoke Railway & Electric Company. In January, 1910, the American Railways acquired the property of both the Lynchburg Traction & Light Company and the Roanoke Railway & Electric Company, Mr. Apperson continuing as president and general manager of both of the companies and becoming a director of the American Railways.

OBITUARY

Michael J. Leary, general freight and passenger agent of the Connecticut Company, New Haven, Conn., died of typhoid fever in the New Haven hospital on Aug. 18, at the age of forty-eight. Mr. Leary had charge of freight and passenger work over the whole system. He was appointed to that office ten years ago, being promoted from the office of general freight agent of the Valley division. Mr. Leary is survived by his widow and three children.

Charles A. Caul, general roadmaster Chicago (Ill.) Railways, died Aug. 11, 1913, after an illness of five weeks, at the age of fifty-six. In 1888 Mr. Caul entered the service of the North Chicago Street Railway as an assistant foreman on track work. Later he was transferred to the operating department, where he worked as a gripman on the old cable cars until 1889. At this time he was placed in charge of the track department with the title of general roadmaster. In 1899, when the North Chicago Railway was taken over by the Chicago Union Traction Company, he was retained in charge of the track department, in which position he served until 1908, when he was made general roadmaster of the Chicago Railways Company. During the rehabilitation period following the acceptance of the 1907 ordinance, he had under his charge as many as 3000 or 4000 men in the extremely busy period. As an evidence of the respect in which he was held by the Chicago Railways Company, all of the offices were closed on the afternoon of his funeral and all construction work was suspended.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Bridgeport & Southern Railroad, Bridgeport, Ill.**—Incorporated in Illinois to build an interurban railway from Bridgeport to Mount Carmel. Capital stock, $25,000. Incorporators: John P. Klein, A. A. Pantelis, O. H. Weidmer, Thomas S. Hogan and George B. Erb, all of Chicago.

***Springfield & Pana Railway, Springfield, Ill.**—Application for a charter has been made by this company to build an interurban railway between Springfield and Pana. Capital stock, $25,000. Incorporators: John E. Melick, C. M. Williams and Charles P. McClaughlin, Springfield; A. C. Sprague, N. Smith and C. C. Melick, Hampton, N. J.

FRANCHISES

San Diego, Cal.—The San Diego Electric Railway has applied to the Council for a franchise over Twelfth Street and Park Boulevard through Balboa Park in San Diego.

Lewiston, Idaho.—F. L. Sturm, representing the Lewiston-Clarkston Valley Railway has asked the Council for an extension of time to Feb. 1, 1914, on its franchise in Lewiston. This line will connect Lewiston, Idaho, with Clarkston and Asotin, Wash. [E. R. J., June 14, '13.]

Bradentown, Ind.—C. A. Mattison, Indianapolis, and associates have asked the Council for a franchise to build an electric railway over certain streets in Bradentown. This is part of a plan to build a line to connect Bradentown, Manatee and Cortez.

Elmira, N. Y.—The Elmira Water, Light & Railroad Company has asked the Public Service Commission, Second District, for the approval of its franchise in South Broadway and for an extension of its lines in Elmira.

Rochester, N. Y.—The New York State Railways has asked the Common Council for two franchises for extensions of its lines in Rochester.

Bryan, Ohio.—The Toledo & Indiana Electric Railway has asked the Council for a franchise to extend its line in Bryan.

Portland, Ore.—The Portland & Oregon City Railway has asked the Council for a street railway franchise in Portland.

Dallas, Tex.—The Southern Traction Company has received a franchise for the right-of-way to permit the joining of the Corsicana and Waxahachie interurban lines to enter Dallas through the river beds and connect with the North Texas Traction Company at about Fifth Street and Oak Cliff in Dallas.

El Paso, Tex.—The Rio Grande Valley Traction Company has asked for a franchise in El Paso.

Oak Cliff, Tex.—The Southern Traction Company has asked the Council for a franchise in Oak Cliff.

TRACK AND ROADWAY

Little Rock Railway & Electric Company, Little Rock, Ark.—This company has definitely decided not to accept the proposition recently submitted by Mayor Charles Taylor for the construction of an electric line across the free bridge, and it has submitted a counter proposition which is to have consideration from the special committee of the Council having the matter in charge.

Fresno, Hanford & Summit Lake Railroad, Fresno, Cal.—It is stated that Kimball & Somers, Oakland, have agreed to supply this company with enough funds to build 20 miles of interurban line out of Fresno, and the plan under which they are willing to operate has been approved by the State Railroad Commission. The company already has rights-of-way from Fresno to Lone Star and at that point the railway branches, rights-of-way having been secured to Sanger, to the east, and to Fowler, Selma and Kingsburg, to the west and south.

Oakland, Antioch & Eastern Railway, Oakland, Cal.—This company has placed in operation its line to Pittsburg, a distance of 8 miles beyond Bay Point, its present terminus in Contra Costa County.

***Arcadia, Fla.**—E. Prouty and George F. Hall, Arcadia, are promoting plans to build a gasoline interurban railway to connect Arcadia, Hall City, Christian Colony, Lake Okeechobee and intermediate points.

Jacksonville & St. Augustine Public Service Corporation, St. Augustine, Fla.—Work will be begun by this company by Oct. 1 on its line between Jacksonville, St. Augustine, Diego and Pablo Beach. Thomas R. Osmond, St. Augustine, general manager. [E. R. J., July 19, '13.]

St. Johns Electric Company, St. Augustine, Fla.—During the next few weeks this company plans to build extensions on several branches of its lines in St. Augustine.

***Sterling, Ill.**—It is stated that arrangements have been completed for financing the construction of an interurban electric railway from Sterling to Savanna and that a company will be organized shortly and a preliminary survey of the route made. William Osborne, 527 South State Street, Chicago, is interested.

Arkansas Valley Interurban Railway, Wichita, Kan.—It is reported that this company plans to extend its lines to the north in Wichita in the near future.

***Jenkins, Ky.**—It is stated that the Consolidated Coal Company is preparing plans to build an 8-mile electric railway between Jenkins, McRoberts, Dunham and Burdine.

Louisville & Interurban Railroad, Louisville, Ky.—Plans are being considered by this company for an extension of its suburban line from Orell several miles west to Kosmosdale.

Shreveport (La.) Traction Company.—Work has been begun by this company upon plans for many improvements of its lines in Shreveport.

Calais (Maine) Street Railway.—It is reported that this company plans to build a ½-mile extension from the corner of King and Union Streets in St. Stephen, N. B., to the fair grounds.

Winnipeg (Man.) Electric Railway.—This company is making progress on the new line to Fort Garry. The company has already over 3 miles of track laid and the wire strung and the grading has been done on another 3 miles.

Concord, Maynard & Hudson Street Railway, Maynard, Mass.—During the next three weeks this company plans to build two concrete bridges. One structure will be erected at Acton, Mass., and the other in Concord, Mass.

Worcester (Mass.) Consolidated Street Railway.—Plans are being made to have this company build an extension through Brook Street to the town line on Greeley Street in Clinton.

Detroit (Mich.) United Railway.—Plans are being made by this company to secure right-of-way to double-track its line between Royal Oak, Flint, Rochester and Oxford.

***Flint, Mich.**—Vincent R. Coon, Detroit, and associates are considering plans to build a 14-mile electric railway from Flint to Fenton via Long Lake.

Commonwealth Power, Railway & Light Company, Grand Rapids, Mich.—It is reported that this company will expend about $100,000 for the improvements on the Grand Rapids, Holland & Chicago Railway, which it controls.

***Holland, Mich.**—The West Michigan Park Association is preparing plans for the construction of an electric railway on the north shore of Black Lake to Ottawa Beach.

Kalamazoo-Grand Rapids Electric Railway, Kalamazoo, Mich.—Over 30 miles of track have been laid by this company and the grading for the entire line will be completed by Sept. 1 for its 50-mile line between Kalamazoo and Grand Rapids.

Minnesota Central Railway, Minneapolis, Minn.—This company states that it has begun the construction of its 66-mile electric line from Minneapolis to St. Cloud, via Robbinsdale and Champlin. E. G. Potter, Minneapolis. [E. R. J., Aug. 16, '13.]

***Springfield, Mo.**—Plans are being made to begin surveys at once for the proposed electric railway to connect Hollister, Powersite and Branson. This line will connect with the St. Louis & San Francisco Railroad at Ozark. W. J. Campbell, St. Louis, is interested.

Brooklyn (N. Y.) Rapid Transit Company.—Plans for the reconstruction of the Sea Beach line of the Brooklyn Rapid Transit System as a four-track depressed line from its connection with the Fourth Avenue subway, about Sixty-fifth Street, Brooklyn, to a point immediately south of Eighty-sixth Street, near Coney Island, have been filed with the Public Service Commission by the New York Municipal Railway Corporation, an auxiliary of the Brooklyn Rapid Transit Company.

***Great Neck, N. Y.**—J. T. McGovern, A. Wolf, John C. Baker and Melvin D. Chapman are promoting plans to build a 1-mile electric line between the steamboat landing and North Hempstead Turnpike in Flushing.

Frontier Electric Railway, Niagara Falls, N. Y.—Arrangements are being made for the beginning of work on the double-track line of this company between Niagara Falls and Buffalo. All obstacles that have been confronting the company have been overcome. Under the company's franchise with the city of North Tonawanda, the line must be well under way by July 1, 1914. No contracts for rails, power poles, rolling stock or other equipment has yet been placed. James S. Simmons, vice-president. [E. R. J., July 26, '13.]

Piedmont & Northern Railway, Charlotte, N. C.—Plans are being made by this company to relocate one of its lines in Greenville, also to build on Academy Street from Washington Street to McBee Avenue, in order to make certain other improvements at an expenditure of about $150,000.

***King, N. C.**—Right-of-way has been secured to build an electric railway to connect King, Vade Mecum Springs and Stuart, Va. W. D. Wilcox is interested.

Marion & Suburban Railway, Marion, Ohio.—George Whysall, receiver of this company, will ask the court to authorize an issue of receiver's certificates to equip and operate the line, which has not been completed. An issue of $250,000 bonds was made to build the railway, but only a small part of the securities was disposed of.

Youngstown & Sharon Railway & Light Company, Youngstown, Ohio.—This company announces that plans are being made to extend its lines on North Water Street, in Youngstown, as far as Clark Avenue, thence east on that thoroughfare to Sharpsville Street, there to connect with the Sharon-Sharpsville line. The company also proposes to extend its lines east on Silver Street and south through the eastern portion of Sharon and Farrell and connecting at the intersection of the roadway and Spearman Avenue with the Sharon-Wheatland lines.

Ardmore (Okla.) Traction Company.—Plans are being made by this company to begin at once to improve and extend some of its lines in Ardmore.

Portland, Eugene & Eastern Railway, Portland, Ore.—Plans are being made by this company to extend its Alpine branch 7 miles, and the Bellefontaine branch 10 miles, this year. The company is electrifying its Fourth Street line in Portland.

Lehigh Valley Transit Company, Allentown, Pa.—Two heavy grades, a railroad grade crossing and from eight to ten minutes in running time of the interurban service between Allentown and Philadelphia will be eliminated by the completion, about Oct. 1, of the ½-mile reinforced concrete bridge of the Lehigh Valley Transit Company connecting Allentown and South Allentown. The renewal of the rail from Soudertown to Sellersville and the installation of stone ballast between these two points has been completed.

***California, Pa.**—A company will be organized to build an electric line from California to several mining towns along the Monongahela River, including Granville, Centerville, Vesta No. 5, Frederickstown and Millsboro, in Washington and Greene Counties. E. C. McCullough, Uniontown, is the engineer, and C. L. Snowden, Brownsville, is said to be interested in the project. Rights-of-way have already been secured for the greater part of the distance.

Conestoga Traction Company, Lancaster, Pa.—During the next few months this company plans to build several short extensions from Lancaster to Rohrerstown, a distance of about 2 miles. Material has been ordered.

Beaver Valley Traction Company, New Brighton, Pa.—This company has just completed laying about 1800 ft. of new track and it expects to build about 1500 ft. of new track during the next few weeks.

Pittsburgh, Harmony, Butler & New Castle Railway, Pittsburgh, Pa.—Work will soon be begun by this company on its line between Beaver Falls and Ellwood City. This new line will cross the Beaver River from Ellwood to Koppel and connect with the Beaver Traction Company's lines at Morado.

***Shippensburg, Pa.**—Preliminary surveys have been made and right-of-way secured to build a 16-mile electric railway between Shippensburg, Newburg, McKinney and Roxbury. Application for a charter will soon be made and it is ultimately intended to extend this line to McConnellsburg.

Somerset (Pa.) Railway.—Surveys have been completed and preliminary arrangements have been made for the electric line to connect Somerset, Rockwood and Johnstown. C. C. Winslow, Somerset, chief engineer. [E. R. J., Aug. 10, '12.]

Hull (Que.) Electric Company.—During the next few weeks this company expects to replace 5 miles of 56-lb. steel rails with 65-lb. rails on its lines in Hull.

Northern Texas Traction Company, Fort Worth, Tex.—This company is asked to extend its lines in Fort Worth to the South Ryan addition.

Ogden (Utah) Rapid Transit Company.—Definite plans have been adopted by this company to build the extension from Twenty-fifth Street along Jefferson Avenue in Ogden.

SHOPS AND BUILDINGS

Sioux Falls (S. D.) Traction Company.—This company is now erecting its new carhouse, office, shop and waiting room building in Sioux Falls. The structure will be 88 ft. x 150 ft., with a capacity for twenty-four cars.

Galveston-Houston Electric Railway, Galveston, Tex.—It is stated that plans are being considered by this company to build a new passenger station in Galveston in the near future.

POWER HOUSES AND SUBSTATIONS

Los Angeles Gas & Electric Corporation, Los Angeles, Cal.—This company will install in its power plant the following apparatus: One 300-kw motor-generator set consisting of one 250-125-volt, three-wire d.c. generator direct connected to one 2400-volt, three-phase, 60-cycle, 870-r.p.m. induction motor. The apparatus has been ordered from the Westinghouse Electric & Manufacturing Company.

St. Johns Electric Railway, St. Augustine, Fla.—This company plans to build superheaters on all of its boilers.

Somerset Traction Company, Skowhegan, Maine.—During the next month this company will award contracts to build a new substation.

Boston (Mass.) Elevated Railway.—This company will add to its power plant equipment two 2000-kw, 600-volt d.c., six-phase, 25-cycle commutating-pole, self-starting rotary converters and six 375-kva, 13,200-volt, 25-cycle air-blast transformers, together with one switchboard for control of same. All this apparatus is being built and will be installed by the Westinghouse Electric & Manufacturing Company.

Southern Power Company, Charlotte, N. C.—This company has placed in operation its new steam plant at Mount Holly.

Columbus, Delaware & Marion Railway, Marion, Ohio.—An order has been placed by this company for a 750-kw turbine to be installed at its power plant at Marion by the General Electric Company.

Pittsburgh, Harmony, Butler & New Castle Railway, Pittsburgh, Pa.—It is reported that this company has secured an option on the organ works at Morado, where it plans to build a new power plant.

Utah Light & Railway Company, Salt Lake City, Utah.—Work will soon be begun by this company on a new substation at Bountiful which will supply power for its new interurban line between Salt Lake City and Bountiful. The structure will contain a 500-kw motor-generator set and auxiliary equipment, but is being built large enough to contain additional apparatus in case the company decides to extend its lines further north.

Manufactures and Supplies

ROLLING STOCK

Grafton (W. Va.) Traction Company is in the market for several cars.

County Traction Company, Chicago, Ill., is in the market for thirty cars.

Santa Barbara & Suburban Railway, Santa Barbara, Cal., is in the market for two cars.

Illinois Traction System, Peoria, Ill., has ordered one parlor car from the St. Louis Car Company.

Milwaukee (Wis.) Western Electric Railway is contemplating the purchase of a considerable amount of new rolling stock in the near future.

TRADE NOTES

Electric Service Supplies Company, Philadelphia, Pa., has received orders for automotoneers from the Dallas (Tex.) Consolidated Electric Railway and the Des Moines (Ia.) City Railway.

Burton W. Mudge Company, Chicago, Ill., announces that Robert M. Smith, for the past year Eastern sales manager of the company, has been appointed general sales manager, with offices in Chicago.

Curtain Supply Company, Chicago, Ill., has received an order for its No. 48 ring-fixture curtains with Rex all-metal rollers to be installed in twenty-five new cars of the Boston Elevated Railway now being built by the American Car & Foundry Company.

General Electric Company, Schenectady, N. Y., has received an order from the East St. Louis & Suburban Railway to equip the ten interurban cars now being built by the American Car Company with ten four-motor GE-216 equipments, with K-35 control.

Ackley Brake & Supply Company, New York, N. Y., announces that T. Narushewitz, chief engineer of the Moscow (Russia) Municipal Railways, will attend the fall convention of the American Electric Railway Association at Atlantic City as guest of this company.

Allis-Chalmers Manufacturing Company, Milwaukee, Wis., will remove a part of its Chicago works to Milwaukee in an endeavor to concentrate its manufacturing plants in that city. By this change nearly 1000 of its employees will be transferred to its Milwaukee plant.

American Engine & Electric Company, Bound Brook, N. J., announces that it has taken over the business of the American Engine Company and will have increased facilities for the manufacture of the American-Ball high-speed steam engines, which have been built by the latter company for the past seventeen years.

Tillsonburg Electric Car Company, Tillsonburg, Ont., has been organized with the following officers: C. G. Davis, president; V. A. Sinclair, vice-president; J. T. Baillie, manager; F. Chandler, superintendent, and William Russ, secretary-treasurer. The company's plant is now nearly complete and operations will be begun in the near future.

Philadelphia Holding Company, Philadelphia, Pa., has received a recent order for its radial trucks from the Selma Street & Suburban Railway for 27-ft. 2-in. one-man cars, weighing approximately 11,000 lb. and having a 13-ft. 6-in. wheelbase; one from the Mahoning & Shenango Railway & Light Company for 24-ft. car bodies, weighing 16,000 lb. and having a 13-ft. 6-in. wheelbase, and another from the Montreal Tramways for 24-ft. car bodies having a 14-ft. wheelbase.

Warner International & Overseas Engineering Company, Ltd., London, Eng., has placed in service one of its non-parallel single trucks, with air-brake equipment, on the Toronto (Ont.) Railway. This truck, on which is mounted a new car body, has proved very satisfactory in every way, particularly so as regards its easy running. This is the first time the Warner equipment has been used in Canada, although it is standard on a great many railways in other countries.

T. C. White Company, St. Louis, Mo., has just placed on the market a new design of porcelain strain insulator. This new type is intended for use on high-voltage lines. It is almost square in shape, and thus the distance between the grooves through which the cables pass is greater than in any other shape and the leakage surface is correspondingly effective. In this new insulator the unglazed surface, so common at one end of ordinary porcelain insulators, has been eliminated.

American Car & Foundry Export Company, St. Louis, Mo., has been incorporated in Delaware, with a capitalization of $500,000, as a subsidiary of the American Car & Foundry Company. The foreign export business of the American Car & Foundry Company, at present managed by a large commission house, will pass entirely into the hands of this new subsidiary company, which will have offices in London, Berlin, Paris and in several South American cities. The incorporators are J. M. E. Ames, William M. Hager and Charles S. Gawthrop.

ADVERTISING LITERATURE

Railway Track-Work Company, Philadelphia, Pa., has issued a folder illustrating its reciprocating track grinder.

T. C. White Company, St. Louis, Mo., has issued a folder illustrating the different styles of its improved porcelain strain insulator.

H. W. Johns-Manville Company, New York, N. Y., has issued a folder describing its J-M metallic flexible sand spout for street cars.

Railway Improvement Company, New York, N. Y., has issued Catalog No. 3, which contains letters from interurban railways showing the economy resulting from the use of its coasting time recorders.

Bonney Vise & Tool Works, Allentown, Pa., have issued Catalog No. 16, describing and illustrating its different types of wrenches and vises. It also contains price lists of these tools, according to size.

American Safety Fender Company, Seattle, Wash., has issued a folder entitled "Fender Efficiency," containing a record of pick-ups made by the Nelson automatic air-controlled street car fender in Portland, Ore.

Chicago Pneumatic Tool Company, Chicago, Ill., has issued Bulletins Nos. 34-B and E-29, describing and illustrating respectively its "Chicago Pneumatic" power-driven compressors and its Duntley and Universal electric grinders.

Electric Service Supplies Company, Philadelphia, Pa., has issued a folder describing the different processes of manufacture of the Keystone steel gear cases and illustrating the method of spot welding embodied in the manufacture of these cases, as well as showing their lightness and the ease with which they can be repaired.

NEW PUBLICATION

Street Railway Reports, Volume 8. Matthew Bender & Company. Cloth, 393 pages. Price, $5.

An annotated edition of "Street Railway Reports," Volume 8, which contains reports of all electric railway and street railway decisions of both federal and state courts in the United States, has recently been published by Matthew Bender & Company. The major portion of the book is devoted to full reports of cases of interest in the electric railway world, and about one-quarter of the letterpress contains cases given only in brief syllabus form. The book is well supplied with annotations giving pertinent references at appropriate points, and at the front is placed an index to these special notes, not only for this particular volume, but for the entire eight. The best feature of the book for the busy railroad official, however, is the complete index, containing the various subjects arising under electric railway litigation and the cases reported on these points in the whole series. This outline is well classified to cover such points as "abutting owners," "advertising in cars," "arrest of passengers," "municipal regulation of brakes," "contributory negligence," "contracts creating a monopoly," "ejection of passengers," "duties of employees," "duties of pedestrians," "transfers" and all other points that may come up in the daily operation of an electric interurban or street railway. The book as a whole is excellent in its arrangement, exhaustive in the ground covered, clear-cut in the general editorial work, and the claim agent and company lawyer should find it of great assistance in looking up the latest decisions on all points.

THE sash and curtain runways of the Brill Semi-Convertible Car are now cut in the posts and not formed by a "parting strip" as in the past, except for a short section at the top to allow the sashes to be removed. This change, adopted some time ago, makes the posts stronger than ever and enables the sashes to be taken out in shorter time.

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